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NOTE ON THE FORMS OF KALMIA LATIFOLIA.

Alfred Rehder.

The discovery of a new locality for the peculiar form of *Kalmia latifolia* with the corolla divided into five narrow petals recorded by Professor G. E. Stone in the October number of Rhodora (p. 199) is very interesting and shows that forms exhibiting exactly the same character of variation may originate independently at different localities and at different times. Besides this form several other distinct forms of the same species are known and have been introduced into cultivation, incidentally receiving varietal names published mostly in European dendrological and horticultural publications. As these names have apparently not yet been recorded in the botanical literature of this country and all the forms were probably originally found wild and may be found again, it will certainly be of interest to the student of our flora to give here an enumeration of these forms.

Variation in the Shape of the Corolla.

Kalmia latifolia f. **polypetala** (Nicholson) — *K. latifolia* var. *polypetala* [Nicholson], Hand-list Arb. Kew II. 49. 1896 — Rehder, Möller's Deutsch. Gärtn.-Zeit. XVIII. 578. 1903.— *K. latifolia monstruosa* Mouillefert, Traité Arb. Arbriss. II. 1027. 1897 — *K. latifolia* var. *monstruosa* Rehder in Bailey, Cycl. Am. Hort. II. 854. 1900. This form, as mentioned by Professor Stone, was first found by Miss M. Bryant near South Deerfield, Mass., in 1870 and described by Asa Gray in 1871 (Am. Nat. IV. 373) as a form showing dialysis with staminody, later an illustration was published by Professor C. S. Sargent in Garden & Forest III. 452, fig. 56, 1890. In the plants now

in cultivation the tendency towards staminody is much less marked than in the specimen described by Gray and preserved in the Gray Herbarium, also Professor Stone did not observe it in the plant he discovered.

Variation in the Color of the Corolla.

Kalmia latifolia f. **alba** (Mouillefert) — *K. latifolia alba* Mouillefert l. c.— *Kalmia latifolia* var. *alba* Lavallé, Arb. Segrez. 159. 1877 — Rehder in Bailey l. c. This form has white flowers with the purple markings very faint.

Kalmia latifolia f. rubra Sweet ex K. Koch, Dendr. II. 1.152. 1872.— *K. latifolia* var. *rubra* Rehder in Bailey l. c.— *K. latifolia Pavartii* André, Rev. Hort. 1888. 540, with color. pl.— Mouillefert l. c. Flowers deep pink; the leaves are usually of a somewhat darker green and a little more thickish than in the type. Like the preceding it is connected with the light pink flowered type by intermediate forms.

Kalmia latifolia f. **fuscata** (Rehder) — *K. latifolia* var. *fuscata* Rehder, Möller's Deutsch. Gärtn.-Zeit. XVIII. 578. 1903. Flowers somewhat smaller inside with a broad brownish purple or almost chocolate colored band dissolved toward the base into brown dots and edged at the upper margin with a narrow pink border, outside whitish with the dark color shining through. New York: Canaan Four Corners, *Dr. Childs*, June 23, 1903 (type in Herb. Arnold Arb.). This form is not in cultivation; living branches sent to the Arboretum and grafted failed to grow.

Variation in the Shape of the Leaves.

Kalmia latifolia f. myrtifolia K. Koch, Dendr. II. 1. 153. 1872. — *Kalmia latifolia* var. *myrtifolia* Jäger, Ziergehölze 280. 1865.— E. S. Rand, Rhododendrons 125. 1871.— Rehder in Bailey l. c.— *K. latifolia* f. *minor* K. Koch l. c.— *K. latifolia* var. *nana* Lavallé, Arb. Segrez. 139. 1877.— *K. myrtifolia* André, Rev. Hort. 1883. 10, fig. 1. Leaves small, lance-oblong, 2–3 or rarely to 4 cm. long and about 1 cm. broad; usually only a few feet high and forming a dense and compact bush.

Kalmia latifolia f. **obtusata** (Rehder) — *Kalmia latifolia* var.

obtusata Rehder, Möller's Deutsch. Gärtn.-Zeit. XVIII. 577. 1903. Leaves oval to oblong-obovate, rounded at both ends or only slightly narrowed, at the apex furnished with an obtuse yellowish mucro, 4–7 cm. long and 2.3–3.7 cm. broad, dark green above and on both sides with a conspicuous yellow midrib; petioles stout scarcely 1 cm. long. Like the preceding form this is of slow growth and forms a compact bush, the broad obtuse stiff leaves resembling those of *Rhododendron catawbiense* except that they are smaller. This form is in cultivation at the Arnold Arboretum since 1886, when it was propagated from a plant discovered a short time ago by Mr. James Bowditch near Pomfret, Connecticut.

Arnold Arboretum.

REPORTS ON THE FLORA OF THE BOSTON DISTRICT,—VI.

ALISMACEAE.

ALISMA.

A. Plantago-aquatica L. Shallow water with muddy bottom, throughout.

ECHINODORUS.

E. tenellus (Martius) Buchenau. "Near Mt. Auburn, Cambridge" (*Thomas P. James*, 1868 and August, 1869); "On margin of pond, north side Watertown road above R. R. station at Mt. Auburn, Cambridge" (*Wm. Boott*, Aug. 31, 1869); "Mud Pond, Watertown Road" (*Thomas P. James*, September, 1873). Muddy shore of Winter Pond, Winchester, various collections since 1876. These are the only New England stations ever reported for this very rare plant.

LOPHOTOCARPUS.

L. spongiosus (Engelm.) J. G. Sm. Alewife Brook, W. Cambridge (*Wm. Boott*, Aug. 21, 1870); Mystic River (*Wm. Boott*, September, 1863 and Aug. 12, 1868); bank of Mystic Pond (*Wm. Boott*, Oct. 1, 1876); Woburn Pond (*Wm. Boott*, Aug. 21, 1863); tidal river flats, Newburyport (*A. A. Eaton*, 1898; *M. L. Fernald*, Oct. 2, 1902).

SAGITTARIA.

S. Engelmanniana J. G. Sm. Muddy or peaty soil around ponds and wet places. Ponkapog Pond, Canton and Randolph (*J. R. Churchill,* July 19, 1870; *G. G. Kennedy,* Sept. 3, 1888; *C. H. Knowlton,* Aug. 1, 1908); Milton (*A. W. Cheever,* Aug. 14, 1905); Grassy Pond, Acton (*J. R. Churchill,* Aug. 4, 1888); Gleason's Pond and small unnamed ponds, Framingham (*A. J. Eames,* Sept. 5, 1908); Long Pond, Tewksbury (*Wm. Boott,* Aug. 24, 1865); Round or Priest Pond, Tewksbury (*H. H. Bartlett,* Sept. 21, 1905. "Reproduces also by long flagelliform stolons with a winter bud at end").

S. graminea Michx. Shallow water; scattered stations in northern half of district.

S. heterophylla Pursh. Canal bed, S. Lawrence (*A. S. Pease,* July 9, 1902).

S. heterophylla Pursh, var. **rigida** (Pursh) Engelm. Newbury (*A. A. Eaton,* July 28, 1903).

S. latifolia Willd. Wet places throughout, common. All the forms represented in Gray's Manual have been reported.

S. subulata (L.) Buchenau, var. (?) **gracillima** (Wats.) J. G. Sm. Paul's Bridge, Neponset River, Milton; Charles River in Newton, Needham and Natick; Waban Brook, Wellesley. "Concord River" (*A. W. Hosmer.* See RHODORA, i. 224. 1899).

S. teres Wats. Sandy Pond, Lincoln (*A. W. Hosmer.* See RHODORA, l. c.). The only authentic report from north of Cape Cod.

HYDROCHARITACEAE.

ELODEA.

E. canadensis Michx. Quiet water of ponds and streams; North Andover, Cambridge, Medford, Wayland; also Charles River near Wellesley.

VALLISNERIA.

V. spiralis L. Deep still water; scattered stations in northern half of district. The earliest record is by Wm. Boott, who collected the plant in Mystic Pond, Aug. 26, 1853.

ARACEAE.

ACORUS.

A. Calamus L. Swamps and borders of still waters, common throughout.

ARISAEMA.

A. triphyllum (L.) Schott. Rich moist woods, common and abundant.

CALLA.

C. palustris L. Very wet muddy places. We have no records from the southeastern section, but the plant occurs sparingly throughout the rest of the district.

PELTANDRA.

P. virginica (L.) Kunth. Wet meadows and muddy shores, frequent throughout.

SYMPLOCARPUS.

S. foetidus (L.) Nutt. Wet woods and swamps; common and abundant throughout.

LEMNACEAE.

LEMNA.

L. minor L. Still water, common in central part of the area.

L. trisulca L. Fresh Pond, Cambridge (*Wm. Boott*, August, 1859; *C. E. Perkins*, July 17, 1879); Glacialis, Cambridge (*J. Murdoch, Jr.*, May 7, 1904); Lincoln (*E. F. Williams*, Sept. 5, 1902); "Alewife Brook below bridge on the Powderhouse Road, Medford" (*Wm. Boott*, Nov. 3, 1867).

L. valdiviana Philippi. Nooks in slow streams; Monatiquot Stream, Blue Hill Reservation; and Beaver Brook, Sharon.

SPIRODELA.

S. polyrhiza (L.) Schleid. Still water; frequent in northern half of district, but not reported from the southern towns.

ERIOCAULACEAE.

ERIOCAULON.

E. septangulare With. Borders of ponds, emersed or in water of varying depth, common.

XYRIDACEAE.

XYRIS.

X. caroliniana Walt. Wet places, rather common. Not reported from southeastern towns.

X. flexuosa Muhl. Wet places, rare, Essex Co. (no date. Specimens in Herb. Bost. Soc. Nat. Hist.[1]); Concord (*Miss F. C. Prince*, no date. Specimens in Herb. Bost. Soc. Nat. Hist.); Boston (— *Boott*, 1830. Specimens in Herb. Bost. Soc. Nat. Hist.[2]).

X. Smalliana Nash. Wet places on borders of ponds; Acton, Essex, Littleton, Milton, Tewksbury, also shores of Ponkapaug Pond in Canton and Randolph. Wm. Oakes collected this species in a pond in Middleton before July 31, 1848, the date of his death. Specimen in Herb. Bost. Soc. Nat. Hist.

[1] It is possible that these specimens were collected by William Oakes, but the handwriting on the label is not sufficiently conclusive.

[2] There is a special interest attaching to these specimens of Boott's. They are four in number, three of them being mounted and one loose in a paper pocket. The label reads "Xyris Jupicai, Boston. From Boott, 1830." The first three words are in the handwriting of Francis Boott, while the last three are in an unknown hand and are inserted on the lower left-hand corner of the label. The date, 1830, evidently refers to the time when Francis Boott presented the specimens. He could not have collected the plants in Boston in 1830, for Dr. Asa Gray says, in an obituary notice published in the Amer. Journ. Sci. and Arts for March, 1864, "In the year 1820 Dr. Boott crossed the Atlantic for the last time, and, proceeding to London, entered upon the study of medicine." Dr. Boott might have collected the specimens before he sailed for Europe. It does not seem at all likely that his brother William made the collection, for his active work began much later, after 1853 or thereabouts, as the numberless labels, accompanying his specimens deposited in the Gray Herbarium, show.

It seems very likely that the plants were collected by another brother, John Wright Boott, about whom comparatively little is known. He was born in 1788 or 1789 and lived with his brother William on the present site of the Revere House, Boston. A beautiful garden adjoined the house. In the summer of 1816 John ascended Mt. Moosilauke in New Hampshire with his brother Francis, but the most interesting fact that we know of him is in connection with *Prenanthes Boottii* (DC.) Gray, the small composite of the alpine regions of northern New England and New York. Doubtless few botanists are aware that this plant was named for John Wright Boott. He collected it in the White Mountains of New Hampshire in 1829 and sent it to London to his brother Francis, who in turn sent it to Geneva to De Candolle. De Candolle named the plant for the collector *Nabalus Boottii* and kept the specimen in his herbarium in Geneva. Prof. M. L. Fernald, when in Geneva in 1903, photographed the sheet, and prints are at the Gray Herbarium. The original label is in Francis Boott's handwriting and reads as follows, "Prenanthes ——? from White Mountains North America above the woods J. W. Boott 1829." Another label in DeCandolle's handwriting reads, "Nabalus Boottii DC." John Wright Boott died by suicide on March 7, 1845, and lies buried at Mount Auburn. [W. D.]

COMMELINACEAE.

COMMELINA.

C. communis L. Waste places; Boston, Cambridge, Chelmsford, Dover, Winchester.

TRADESCANTIA.

T. virginiana L. Waste places; Ashland, Framingham, Marshfield, Needham, Walpole.

PONTEDERIACEAE.

HETERANTHERA.

H. dubia (Jacq.) MacM. Pleasant Pond, Wenham (*G. E. Davenport*, Aug. 16, 1875. Specimen in Gray Herb.)

PONTEDERIA.

P. cordata L. Muddy ponds and streams, common throughout.

C. H. Knowlton
J. A. Cushman
Walter Deane
A. K. Harrison
} *Committee on Local Flora.*

Ramalina Montagnaei DeNot., on Long Island.— Messrs. D. P. and J. E. P. Morgan brought me, in October, abundant material of this Austral lichen from Southampton, Long Island, N. Y., collected on cedars, September 15, 1909. Both the plant and spores are quite typical, the latter measuring μ 24–32 × 4–5. This is the northernmost locality from which this lichen has been reported, having never been collected, so far as I am aware, north of South Carolina (*Ravenel*). The insular climate, and proximity to the Gulf Stream, explains no doubt its presence in this latitude.

Examples are deposited in the author's herbarium (No. 1677), also in Dr. L. W. Riddle's, Wellesley, Mass., and in the herbarium of Harvard University, Cambridge, Mass.— R. Heber Howe, Jr., Thoreau Museum, Concord, Massachusetts.

FLORA OF LOWER CAPE COD; SUPPLEMENTARY NOTE.

F. S. Collins.

In my paper on the flora of lower Cape Cod [1] I made only brief mention of the native trees; I had given little attention to them, only noticing their presence as I passed by, with my mind more on herbaceous plants and cryptogams. In a short visit to Eastham in September last, I looked more closely, and now think that the expression I used does not do justice to the oaks. "Scrub oaks" certainly describes their habit, as they form dense thickets, usually with pines interspersed, over considerable areas, but when I examined these thickets more closely, to see if they were composed of *Quercus ilicifolia,* our common scrub oak near Boston, or *Q. prinoides,* of somewhat more southern range, I was confronted with a bewildering variety in the form and size of the leaves, and a great scarcity of acorns. Especially in districts that had been burned over the new growth showed leaves of enormous size and undecided contour. It was only by tracing the connection from these scrubs to the older trees, that any definite forms could be determined, and then it was a surprise to find that my "scrub oak" included no less than four species; *Q. alba, Q. velutina, Q. ilicifolia* and *Q. prinoides* var. *rufescens.* I was on the watch for *Q. stellata,* but did not find it; I think, however, it may yet be found, as it occurs in Brewster, only eight miles up the Cape.

In the Rev. Mr. Pratt's history of Eastham, from which I quoted, he speaks of a native forest of considerable extent formerly existing in the northern part of the town, but improvidently destroyed; I think a small part of this still exists, as the old "Camp Meeting Grove." It is many years since camp-meetings were held here, and the only indication of its former use is found in the decaying benches in the central open space, which is steadily growing smaller as the seedlings advance from the circumference. The sacred groves were reverenced by the ancients, and part of this reverence may have lasted even till now, and saved these trees. All four species of oaks grow here, and the trees of *Q. alba* and *Q. velutina* appear to be of a good old age. In absolute measurement they are not large or tall, I think none are over thirty

[1] Rhodora, Vol. XI, p. 125.

feet high, but in this region everything is on a small scale, and they are relatively noble trees; a very dense growth of lichens covers the trunks, and a few of the larger trees seem to be dying of old age, but most are still vigorous. Here and there among them are a few individuals of *Juniperus virginiana* of normal development, and about the central open area are some rather dwarf individuals of *Populus alba.* There is quite a depth of vegetable mould under the trees, which seems to be favorable to herbaceous plants; *Solidago puberula* grows here, of normal size; it is the only station I have observed in the town. The largest tree in Eastham, curiously, is not among these native trees. A large and well shaped *Ailanthus glandulosa* quite overshadows the house of Captain Higgins. The captain is the owner of a golden-headed cane, presented to him by the Boston Post as the oldest inhabitant of the town, but when I asked him when the tree was set out, he could not tell me. His predecessor in the house, "The old captain" he called him, had brought it from foreign parts and set it out there, so he understood.

This year I visited an interesting locality in the town, the so-called "Sunken Meadow." This is near the bay shore, separated from it by a fairly high, continuous sand dune. The name represents its appearance, but is misleading, as the place is evidently a tract of salt marsh, which has been cut off from the sea by the formation of the dunes, and in which the salt marsh plants are being supplanted by those of the uplands. The characteristic fertility of land reclaimed from the sea appears here; the hay crop is the best in town, and the wild plants have a better nurtured look than elsewhere in Eastham. *Solidago neglecta,* for instance, was common, the plants large and luxuriant; I had not met it before in the town. In the middle of the "Sunken Meadow" is a pond, on which ice has been cut for many years; so that the time when it was connected with the sea must be remote. Its appearance is quite that of an ordinary salt marsh pool, and the dense coating of algae covering its surface seems to be what is usually found in stations of the same appearance; *Cladophora expansa* Kütz., *Lyngbya aestuarii* (Mert.) Liebm., *Enteromorpha* species, etc.; but when examined more closely, there are found among these marine forms such fresh water plants as *Spirogyra, Microspora* and the like. The area now occupied by the salt water plants, including land and water forms, is relatively small, and is probably decreasing,

but the plants do not appear to be dwarfed. The halophytic Old Guard, though surrounded by advancing enemies, is not yet ready to surrender.

Malden, Massachusetts.

NOTE ON BOEHMERIA CYLINDRICA, VAR. DRUMMONDIANA.

M. L. Fernald.

In 1854, in his *Revue de la Famille des Urticées*, Weddell described from Texas a *Boehmeria* as follows: "B. Drummondiana †: foliis ovatis, acutis, subacuminatis, basi subcordatis, serratis, rigidulis, supra hispidulis demum glabratis asperrimis, subtus molliter pubescenti-tomentosis; spicis brevibus, erectis.— Texas (Drummond, pl. exs., no. 267)."[1]

Subsequently, however, Weddell concluded that the plant was only a variety of *Boehmeria cylindrica* (L.) Sw.,[2] treating it in DeCandolle's Prodromus as *B. cylindrica, β, Drummondiana.*[3]

In 1889, Porter, describing a plant which is found in bogs of New Jersey and eastern Pennsylvania characterized it as follows: "*Boehmeria cylindrica*, Willd., var. scabra, n. var.— Erect, strict, 2 feet high; leaves thick and rigid, very rough on the upper surface, tomentose beneath, on short petioles or almost sessile [,] usually reflexed and pressed against the stem; spikes densely flowered, much longer than the petioles."[4]

Under the name, var. *scabra* Porter, the plant with the leaves harsh above and more or less tomentulose beneath has been generally taken up, and Small has advanced it to specific rank as *Boehmeria scabra* (Porter) Small,[5] with a range extending from "New York to Michigan, Kansas, Florida and Texas." But no one in recent years seems to

1 Weddell, Ann. des Sci. Nat. 4me Sér., i. 201 (1854).

2 *B. cylindrica* is very commonly cited as dating from Willd. Sp. iv. 340 (1805); but it was clearly published in Swartz, Prodr. Veg. Ind. Occ. 34 (1788).

3 Weddell in D. C. Prodr. xvi. pt. 1, 202 (1869).

4 Porter, Bull. Torr. Bot. Cl. xvi. 21 (1889).

5 Small, Fl. S. E. U. S. 358 (1903).

have noted the fact that Weddell had already described *B. cylindrica,* var. *Drummondiana* (*B. Drummondiana*) with the same peculiarities of foliage as those which characterize var. *scabra* Porter. A specimen of Drummond's no. 267 (the type number of Weddell's species or variety) is in the Gray Herbarium and it is identical with the plant of broad distribution on the coastal plain from Nantucket to northern Mexico which is generally passing as var. *scabra.* Although easily separated from typical *B. cylindrica,* the variety often simulates it in having the leaves thinner and on longer petioles than in the extreme of the variety, and in bogs and open situations the smooth-leaved plant often has thick short-petioled leaves which simulate those of the variety. It is thus apparent that it is wise to accept Weddell's mature judgment and that of Dr. Porter, in regarding the plant as a variety of *B. cylindrica* rather than a distinct species. In fact, Mr. E. P. Bicknell, who has often urged that the occurrence of transitional forms should not invalidate the title to specific rank of plants which in their extremes are easily recognizable, is inclined to follow the conclusion of Weddell and of Porter, for, in his critical notes on *The Ferns and Flowering Plants of Nantucket,* although listing the plant as *B. scabra* (Porter) Small, he adds the note: "Typical examples appear very distinct from *Boehmeria cylindrica* but the two plants seem to run together and may prove to be only extreme conditions of one species." [1]

By those who still incline to treat the plant as a species it should be known, then, not as *Boehmeria scabra* (Porter) Small but as *B. Drummondiana* Weddell; while by those who feel that the facts of Nature are more precisely stated by treating as varieties plants which are known freely to intergrade it will be called *B. cylindrica* (L.) Sw., var. *Drummondiana* Weddell.

Gray Herbarium.

Menyanthes trifoliata in West Virginia.— While I was on a collecting trip, to what was once a spruce and hemlock swamp at Cranesville, W. Va., in 1904, my attention was called to a plant growing there that no one seemed to know and which was reputed to have certain medicinal properties. I did not recognize the plant from the description given by the gentleman who inquired about it. I was so

[1] Bicknell, Bull. Torr. Bot. Cl. xxxvi. 29 (1909).

interested in finding out what the plant might be, that I went to the place where it grew, and collected a number of specimens, one of which I have sent to the Gray Herbarium. I did not know the plant, but found out later that it was *Menyanthes trifoliata* L. The past summer, while on a collecting trip to the Cranberry Glades, Pocahontas County, W. Va., Mr. A. B. Brooks, one of the party, brought me some specimens of the same plant which he had collected in one of the glades. In so far as I have been able to ascertain, these two localities are far south of the previously reported range for *Menyanthes trifoliata*. However, the altitude and the glades correspond to the northern habitat to some extent.— John L. Sheldon, West Virginia University, Morgantown, W. Va.

Zannichellia palustris, an additional record.— I have to record an interesting addition to our list of the *Najadaceae*, published in Rhodora, xi. 205–208. 1909. Professor Wm. G. Farlow has presented me with a specimen of fruiting *Zannichellia palustris* L. which he collected in the northwestern corner of Brighton "in a brackish marsh" on the border of Charles River in August, 1877. Professor Farlow writes, under date of December 6, 1909, "I collected Zannichellia growing with Ruppia on the Charles River between Brighton and Newton. After leaving Faneuil the railroad now crosses a marsh by an embankment which passes opposite the old Stickney place in Watertown. In the ditches near the river towards the Faneuil end of the marsh was Zannichellia and farther back from the river was Zizania. Probably the plants have now disappeared." The locality is nearly opposite the Watertown Arsenal.

These details are of special interest in view of the rapid changes that are in progress in the region about Boston. The construction of the large dam near the mouth of the river has converted the area under consideration into a fresh water way, maintained at a constant level, and the plants that haunt salt or brackish situations, such as have always heretofore existed along the banks of the Charles River as far up as the dam in Watertown, are rapidly disappearing, if indeed they exist at all.

Zannichellia palustris is an uncommon plant in New England, inhabiting sparingly the brackish marshes along the coast, and but rarely occurring inland.— Walter Deane, for the Local Flora Committee.

Sclerolepis uniflora in Rhode Island.— On the 29th of October, 1909, while collecting in company with H. W. Preston and Thomas Hope, the writer found several specimens of *Sclerolepis uniflora* (Walt.) BSP. growing in the sand between the rocks and larger boulders along the shore of Wallum Pond, in the town of Burrillville, Rhode Island. The plants were just coming into bloom, only a few showing fully opened flowers, the majority having small immature heads, often so small as to be almost invisible unless closely examined. Owing to the extreme drought of the past summer the water level of the pond had fallen about eight feet, and the plants were growing some distance from the water. If the pond had been at its normal level the plants would have been in from six inches to two feet of water.

According to the 7th edition of Gray's Manual this plant is known to grow at only one station north of New Jersey, that being in New Hampshire. One noticeable difference from the published descriptions seems worthy of record. The pappus of all the specimens examined almost entirely lacked the horny texture usually recorded for this species.— J. Franklin Collins, Providence, Rhode Island.

Coulter & Nelson's Botany of the Central Rocky Mountains.[1]— The appearance of a descriptive flora, bringing together in a single handy volume a considerable mass of scattered data, the results of some decades of taxonomic activity, is a notable event. For several reasons this is particularly true in regard to the new and exceedingly welcome revision of Coulter's well known Manual. The region covered is one of exceptional diversity and biological interest. It is the seat of a rapidly increasing population and the attractive resort of an ever increasing number of tourists, for whose pleasure as well as information the present work will mean much. Notable in regard to the work is the fact that it has been prepared by a writer whose many years of residence in the region have given him first-hand acquaintance with a large percentage of the plants described.

As to its geographic limits, it may be said that the work aims to cover all the vascular plants of Colorado, Wyoming, the Yellowstone Park, and the Black Hills, most of Montana, southern Idaho, eastern Utah, northeastern Arizona, and northern New Mexico. It describes about 2900 species and varieties, belonging to about 650 genera.

[1] New Manual of Botany of the Central Rocky Mountains (Vascular Plants), by John M. Coulter, Ph. D., Professor of Botany, University of Chicago, revised by Aven Nelson, Ph. D., Professor of Botany, University of Wyoming. 8vo. 646 pages. American Book Co., New York, Cincinnati, and Chicago.

In typography, as well as in the general form of presentation, it bears a considerable resemblance to the recently issued edition of Gray's Manual, the chief differences being the more complete use of block keys, the introduction of a brief bibliographical reference after every accepted specific and varietal name — a feature of decided value — and by the failure to indicate introduced plants by any distinctive type or to emphasize by italics diagnostic traits of particular importance.

There are furthermore no illustrations and no attempt has been made to indicate the correct pronunciation of the scientific names by marks of accentuation, nor is the derivation of generic names pointed out as in many floras.

In the interpretation of specific limits the work appears to be fairly conservative, while in the matter of dividing large and traditional genera, as well as in the nomenclature, a middle course has been followed. Thus, such genera as *Polygonum, Astragalus, Oxalis, Euphorbia,* and *Cornus* are retained in their customary broader sense, while *Oenothera, Aplopappus, Aster,* and several other large genera are divided. This is, of course, a matter on which individual judgment is likely to vary rather widely and be considerably influenced by the particular species within the limits treated. More difficult to grasp is the nomenclatural plan of the work, though in the preface we are told that "the nomenclature, so far as practicable, is that adopted by the Vienna Congress." It is quite true that considerable concession has evidently been made to the international rules, and for this, most professional botanists and the majority of amateurs, who wish to be on an orthodox footing in regard to this matter, will be duly grateful. Thus, it is pleasant to see *Luzula, Smilacina, Spiranthes, Arceuthobium, Suaeda, Spergularia, Stellaria, Mamillaria, Liatris,* etc., but the interspersing of other names like *Roripa, Ratibida, Washingtonia, Parthenocissus, Covillea,* and *Parosela,* suggests an attempt at compromise not easily understood.

The keys seem to have been admirably worked out. They are for the most part dichotomous and the distinctions are stated with a brevity and definiteness of contrast which can only be the result of much study. The metric system of measurements has been used, a matter, we believe, of decided wisdom. On the other hand the use of the trinomial constitutes a pronounced defect. In this connection attention may be called to Recommendation XVIII of the Vienna Rules, which reads "Not to publish a name without clearly indicating whether it is the name of a family or a tribe, a genus or a section, a species or a variety; briefly, without expressing an opinion on the nature of the group to which they give the name." Of the numerous trinomials employed in the work under consideration, some have been originally described as subspecies, the majority as varieties, and some as forms. Here, these different categories are lumped without visible distinction. It is true, in the tabular statistics at the back of the book they are reckoned as "varieties," but those not originally published as

varieties are still quoted without change of authority. It is quite true that sharp distinction in the groups below the species is difficult, especially difficult in the case of a flora newly explored, yet the experience of all older civilizations shows conclusively that such distinctions have ultimately to be made in order to satisfy discriminating taxonomists. The use of the trinomial may be convenient in that it enables a writer to group in a non-committal way all subdivisions of species in one vague and unnamed category, but it is obviously a reactionary measure, avoiding precision, and therefore not likely to persist in the long run. It is comparable with the neglect of small coin in newly settled regions.

Another tendency of the present work which is seen with regret is the raising to specific rank of certain forms or varieties of plants recently introduced from the Old World. Thus the commoner form of the Prickly Lettuce becomes *Lactuca integrata* (Gren. & Godr.) A. Nelson, and the Russian Thistle, *Salsola pestifer* A. Nelson. These are both plants the taxonomic status of which should obviously be determined by affinities with their Old World relatives, and it is, we believe, the universal judgment of botanists of the Old World that they represent in their native habitats merely rather trifling varieties. It can scarcely be supposed that the accidental introduction of these particular varieties on American soil and their consequent rapid dissemination constitutes any valid reason for a change in their rank. Furthermore the editor is not consistent, since he retains *Chrysanthemum Leucanthemum* for the common American White Weed, notwithstanding the fact that it is fully as distinct from the typical European form of that species.

The editor has considerately listed at the end of the book the new scientific names launched in the body of the text. There are about 170 of these, a number by no means excessive; but the list unhappily is by no means complete, for several new names have been coined in the text which are not included. The fact that most of these happen to be combinations lightly launched and not advanced as valid even by their creator would seem to indicate that they had been purposely excluded from the list, which thereby becomes positively misleading. Examples of this are "*P*[*olygonum*] *lilacina* (Greene); *P. calophylla* (Greene), both under *Bistorta*," also several other Polygonums and *Brickellia* (*Coleosanthus*) *umbellatus* (Greene), *B.* (*Coleosanthus*) *albicaulis* (Rydb.), *B.* (*Coleosanthus*) *scaber* (Greene), and *B.* (*Coleosanthus*) *humilis* (Greene). What possible excuse can be offered for the wholly needless creation of these new binomials, endorsed by no one, not even by the author who foists them upon the botanical public? It is true that some of these names may ultimately be taken up by future writers and in that event the editor will win the dubious honor of having his name quoted after them. In this connection attention may be called to Recommendation XIX of the Vienna Rules which reads "Botanists will do well * * * * to avoid publishing or men-

tioning in their publications unpublished names which they do not accept, * * * "

A few misprints and slight errors occur, as must be expected in any work of this extent. Thus the new combination "*Suaeda Moquinii* (Torr.) A. Nelson" and its synonym "*Dondia Moquina* A. Nelson" ring needless changes upon Torrey's original *Chenopodina Moquini*. *Brassica arvensis* is a combination which should be attributed to Kuntze not to B. S. P., and *Melilotus alba* is a name formed by Desrousseaux not by Desvaux. More serious is the lack accuracy in the bibliographical citations. As a test of this matter the genus *Chrysothamnus* was selected at random. Its treatment contains thirty-three citations and of these ten are in some one or more particulars incorrect.

There are several rather surprising omissions from the flora, even in the case of Colorado plants. No mention, for instance, is made of *Encelia nutans* Eastwood or of *Chaenactis scaposa* Eastwood; and what has become of the *Mimoseae* and *Caesalpineae* of which there are at least four genera in Colorado?

Space does not permit the taking up of many minor matters in the separation of species, interpretation of types — We had thought for instance that *Pulsatilla hirsutissima* and *Agrimonia Brittoniana* had been adequately threshed out — applications of names, limits of range, etc.; on which the editor's conclusions are not entirely convincing. On the whole, however, the work has been elaborated with great care, a proper sense of proportion, and a painstaking regard for simplicity, brevity, and clearness. There is much to commend, only details to criticise. At points one wishes the editor had had access to the large eastern herbaria and libraries during his work, but on the other hand he has had the inestimable advantage of prolonged and intensive field-work in the region described.— B. L. R.

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NOTES ON THE PLANTS OF WINELAND THE GOOD.

M. L. Fernald.

The writer was recently asked for photographs, taken in eastern Canada, of the Wild Grape (*Vitis Labrusca*) and of the Wild Rice (*Zizania*) to be used as evidence that the early Norsemen had made a settlement in Nova Scotia; but he was forced to reply, that, so far as botanists are definitely informed, neither of these plants is known to be indigenous in Nova Scotia. From this simple incident it became apparent that much of the evidence that the Norsemen had landed, about the year 1000, upon the coast of Nova Scotia or of New England, is found in the statement that they discovered "Wild Rice" or "Indian Corn" and "Grapes." And, since a consideration of the plants seen upon our coast by Champlain, Rosier, and even later explorers, had already more than once lured the writer from the restricted fields of his special studies, he has been interested to look into the problem of the "Wild Rice," "Grapes," and other plants which were described by the Norsemen as abounding in Wineland the Good.

In the course of this study it has been necessary to refer to the old herbals and other early botanical writings, as well as to accounts of travels in northern lands, in order to gain an accurate conception of just what plants were familiar to the Norsemen of the 11th century, who, it should be borne in mind, were Norse who had settled in Iceland and then in Greenland, and whose chief commerce and contacts were with the home country, Norway. Without attempting in this preliminary notice to discuss many of the details of the sagas which touch upon the flora or any which bear specially upon the fauna, ethnology, and geography of the three regions of eastern America — Helluland, Markland and Vínland — defined in the sagas, it will be

sufficient to give a portion of the evidence in regard to the "Grape," the "Wheat," and the "*mǫsurr*" wood; and to state that the further details which have been assembled in regard to these, as well as the bear, strange whale, Skrellings, ice-capped mountains, and other features, which define the natural and physical characteristics of these, the first regions of America to be described, will, as soon as possible, be presented in a more extended work now in preparation.

In approaching a subject, in many of its details so foreign to the ordinary field of the writer's studies, he should explain, that, in matters pertaining to the original statements of the sagas, he has depended upon the phototype reproductions of the texts and the translations published by Reeves,[1] which have been said to be, "as far as the Scandinavian sources of information are concerned, the final word." In the translation of the Scandinavian and some other passages he has had the generous assistance of Professor W. H. Schofield and in the Latin passages of Professor E. K. Rand; and in the proof-reading he has been assisted by Miss Mary A. Day, Librarian of the Gray Herbarium.

The portions of the original Icelandic texts, which have brought the Grape so prominently into the discussion of Wineland the Good, are frequent statements that the Norsemen found the "*vínber*," which grew "wherever there was hilly ground" and which, according to one version of the story, were so abundant "that their after-boat was filled with '*vínberjum*'. . . .and when spring came, they made their ship ready, and sailed away; and from its products Leif gave the land a name, and called it Wineland." "*Vínber*," literally *wine-berry*, has very naturally been accepted by students of the sagas as "Grape"; and in a work no less authoritative than the Century Dictionary do we find under BERRY, that the Old Saxon "*wīnberi* = A. S. *wīnberie*, 'wine-berry,' grape." In line with this general interpretation, Vínland has been located at various points on the coast of southern New England and Nova Scotia, near the northern limits of the range of Wild Grapes. Storm, in urging the claims of Nova Scotia, cites the finding of Wild Grapes by Cartier on the Isle of Orleans in Quebec [300 miles from the nearest point in Nova Scotia] and by the later French explorers, in 1607, on the St. John River in New Brunswick; but "on

[1] Arthur Middleton Reeves. The Finding of Wineland the Good. The History of the Icelandic Discovery of America edited and translated from the earliest Records. With Phototype Plates of the Vellum Mss. of the Sagas. London. 1890.

the east shore of Fundy Bay, in the environs of Port Royal (now Annapolis, Nova Scotia), the French did not, on the other hand, meet with the grape-vine growing wild; for Lescarbot affirms distinctly, that, though on the west side they found vines in abundance and ripe grapes, in the environs of Port Royal he had seen none such, though the country with its hills was well adapted for their growth. Spite of this, it would, from testimony well-nigh simultaneous, seem to be a matter of certainty, that in southern Nova Scotia the vine also at that time grew wild. We have thus an account by Sir William Alexander, in his 'Encouragement to Colonies' (1624), respecting those he had sent out, who landed, July 1623, in Luke's Bay (Port Mouton, in lat. 43° 55′) on the southeastern coast of Nova Scotia, and explored the country as far as Cape Negro. The author enumerates here the fruits of the region, and in particular 'gooseberies, strawberies, hindberies, rasberies, and a kind of red wine-beries.'"[1]

Storm gives, however, further evidence that a true Grape has been more recently found near Annapolis and Pictou, Nova Scotia. But outside this evidence, based not upon actual specimens preserved in public herbaria, but chiefly upon somewhat traditional statements, we are unable to find any record which can positively be associated with the Grape (*Vitis*) in Nova Scotia.[2] There are four native Grapes recognized in New England and the Maritime Provinces. One, *Vitis Labrusca*, which has given rise to many of our table grapes, occurs in thickets and upon stone-walls, etc., abundantly southward, but locally northeastward along the coast as far as the mouth of the Kennebec. *Vitis aestivalis* and *V. bicolor* are species of rocky woodlands, reaching their northeastern limits in the interior of southern New Hampshire. *Vitis vulpina* is chiefly a river-bank species, known from all the larger river-valleys of New England, but not definitely known east of the St. John valley in New Brunswick, where it is rare and found only in the interior. As indicated by these ranges and as stated above, the evidence of Wild Grapes in Nova Scotia is not wholly convincing to a botanist. In fact, Professor L. H. Bailey, in his treatment of the genus *Vitis* in North America, makes no mention of the Nova Scotia reports.[3]

Furthermore, the mention by Sir William Alexander of "red wine-

[1] Gustav Storm, Studies on the Vineland Voyages, 45, 46 (1889).
[2] See Macoun, Catalogue of Canadian Plants, i. 97 (1883).
[3] See L. H. Bailey in Gray, Synoptical Flora of North America, i. pt. 1, 422 (1897).

beries" on the coast of Nova Scotia should not be taken as indicating that he found Grapes; for a search of botanical writings from the earliest herbals to the latest publications upon the colloquial names of plants in Scandinavia and Great Britain fails to reveal any use of either the name "*vínber*" or "Wine-berry" for the Grape. But, on the other hand, in the more northern countries of Europe at the present day, the names "*vínber*" and "Wine-berry" are still used as folk-names for some of the identical wild fruits which bore those names in the Middle Ages. The Grape, it should be kept in mind, is a fruit of southern Europe and adjacent Asia and Africa, which, when cultivated even in southern England, is ordinarily given artificial protection;[1] and in southern Norway it can be cultivated with success only south of latitude 61°, and then only when trained against a warm reflecting wall.[2]

It seems highly improbable, then, that the Grape should have been familiar, at least from personal experience, to the early Norsemen who sailed from Iceland and Greenland to the western continent. And, in view of the fact that the true Grape is called in Scandinavian *vindrufva*, it is not likely that the Norsemen, if they knew this foreign fruit at all, would have applied to it the name *vínber*, when they already used the latter name for a common and very different wild fruit of Norway.

In the early days of botanical studies in northern Europe an attempt was made to identify all the plants of Germany, Holland, Scandinavia, England, and other northern regions with the plants described from the Mediterranean by Pliny, Theophrastus, and other classical writers upon Natural History. It thus happened that botanists, as late as the 17th and 18th centuries, were still identifying the Currants (*Ribes*) of northern Europe with the Corinth or Currant (*Vitis*) of southern Europe and Asia Minor. Thus, in 1633, Thomas Johnson urged that the "Red Currans," which were "found plentifully growing in many gardens," should no longer be confused with the Currant (small raisin) of the Mediterranean, saying "yet must they not be confounded with those Currans which are brought from Zant, and the continent

[1] See Nicholson, Dictionary of Gardening, iv. 162–170 (1887).

[2] "Um in Norwegen mit einigem Erfolg im Freien Reben zu ziehen, ist das Spalier unerlässlich. Ueber den 61sten Breitegrad hinaus dürfte aber auch diese Culturart nicht genügen, um im Freien reife Trauben zu gewinnen."
— Schübeler, Die Culturpflanzen Norwegens, 97 (1862).

adioyning thereto, and which are vulgarly sold by our Grocers; for they are the fruit of a small Vine [*Vitis*], and differ much from these."[1] But in 1701 the northern Currants (*Ribes*) were still known among students in Scandinavia as species of *Vitis* (the true Vine or Grape), for we find that by Rudbeck[2] *Ribes alpinum* of modern botanists was called "*Vitis, Ribes alpinus dulcis.*" The common Red Currant (the "*Vinbaer*"[3] of the Norwegians, "*Röda Vinbär*"[4] of the Swedes, and "*Wina-maria*"[5] of the Finns) was treated as *Vitis vinifera Ribes*[6] *sylvestris dicta, fructu rubro*"; and the Black Currant of our gardens ("*Svarte Vinbaer*"[7] of the Scandinavians) was called "*Vitis, Ribes sylvestris, fructu nigro olente.*" Prior[8] and Britten and Holland[9] tell us that the Red Currant is still known in the northern counties of England and of Scotland as "Wine-berry," and the Black Currant is also called in northern Scotland "Wine-berry." And as far south as Geneva, where the Red Currant was possibly introduced from the North, it retains a suggestion of its old confusion with the Grape in its colloquial name, *Raisin de mare.*[10]

The use of Currants in making wine, a common practice in New England, was also known to the Norse, Swedes, Russians, Germans, French, English, and other northern peoples. Gunnerus, writing of the Red Currant ("*Ribs* of the Danes and Norwegians, *Viinbaer* also of the Norwegians, *Red currants* of the English"), says: "The people of Christiania prepare from the fully ripe berries a substitute for wine, but from the immature berries they make a substitute for vinegar."[11] Linnaeus, travelling in Schonen (Skåne in southern Sweden), says: "Wine had been made here from the red and white Currants

[1] Gerarde's Herball, ed. Johnson, 1593, 1594 (1633).

[2] Rudbeck, Nora Samolad, sive Laponia illustrata, et iter per Uplandiam, etc., 9 (1701), according to Linnaeus, Flora Lapponica, 64, 65 (1737).

[3] "Norvegis praeterea *Viinbaer*" — Gunnerus, Flora Norvegica, pars 1, 46 (1766).

[4] "*Raeda Winbaer.* Suecis" — Linnaeus, Flora Lapponica, 65 (1737).

[5] "*Wina-maria.* Finnonibus" — Linnaeus, Flora Lapponica, 65 (1737).

[6] The Latin generic name *Ribes* is commonly said to come from the Arabic; but, as the name of the northern currants, it probably come from the Scandinavian *ribs* and *resp.*— See de Candolle, Origine des Plantes Cultivées, 221 (1883).

[7] "Svec. *Svarte Wiinbaer.*"— Gunnerus, Flora Norvegica, pars 2, 11 (1772).

[8] Prior, Popular Names of British Plants, ed. 3, 254 (1879).

[9] Britten and Holland, Dictionary of English Plant-Names, 495 (1886).

[10] "A Genève, la Groseille [*Ribes rubrum* or its close relative *R. vulgare*] se nomme encore vulgairement *Raisin de mare*" — De Candolle, l. c. 221.

[11] "*Ribes rubrum*...Danis & Norvegis *Ribs*; Norvegis praeterea *Viinbaer*...Angl. *Red currants*...*Christianienses ex baccis plene maturis succedaneum* vini, *ex immaturis autem acetum* aceto vini *substituendum parant.*"

Gunnerus, Flora Norvegica, pars 1, 46 (1766).

(*Johannisbeeren*). If the Red Currant-wine was drunk with sugar, it was in taste almost as good as red wine, and was even stronger; moreover it did not ferment as easily." [1]

In Livonia, "Out of the berries is also made a wine pleasing to us, for, if it is well prepared, it resembles pretty much in taste red Burgundy. .... From the dregs left in the cask one can also distill a brandy, which is as good as French brandy." [2] In Germany, "One prepares from it [the Red currant] jelly, a champagne-like wine, which keeps several years, and a very good vinegar." [3] And in England, "Currant wine [from the Red Currant] is made by fermenting the juice with sugar, and is considered as one of the best 'home-made wines,' as we may gather from the nursery song of the tempting qualities of 'cherry pie and currant wine.'" [4]

Barton and Castle tell us that "the fruit of the Black Currant [*Ribes nigrum*, the '*Svarte Vinbaer*' of Scandinavians], though disagreeable to many persons in its recent state, is much used in forming a pleasant and wholesome wine, and a grateful preserve. In Russia and Siberia, a wine is made of the berries alone, or with the addition of honey; and also a distilled spirit." [5] Syme makes a similar statement, that "in Siberia....the berries being fermented with honey, a powerful spirit is distilled from them." [6] And Alphonse de Candolle states that the Black Currant is "used in the manufacture of the liqueurs known as ratafia and cassis." [7]

The other "Wine-berry" of northern Europe is quite different in appearance from the Currant, yet it was likewise confused by early

[1] "Aus *den rothen und weissen Johannisbeeren* war hier *Wein* gepresset worden. Wenn der rothe Johannisbeeren-Wein mit Zucker getrunken ward, so gab er an Geschmack, dem rothen Weine wenig nach, und war schier stärker, kam auch nicht so leicht in Arbeit." Then follows a long account of the method of preparing the wine.— Linnaeus, Reisen durch das Königreich Schweden, 313 (1756).

[2] "Aus den Beeren wird auch ben uns ein gegohrner Wein gemacht, der, wenn er gut gerathen ist, dem rothen Burgunderwein am Geschmack ziemlich gleichkommt.... Von dem im Gefässe nachgebleibenen Hefen kann man einen Brandwein destilliren, der so gut ist, als der Franzbrandwein." — J. B. Fischer, Versuch einer Naturgeschichte von Livland, 443 (1791).

[3] "Man bereitet aus ihnen Gelée, einen dem Champagner ähnlichen Wein, welcher sich mehre Jahre hält, unt einen sehr guten Essig" — Schlechtendal, Langethal & Schenk, Flora von Deutschland, 5te Aufl. xxii. 275 (1885).

[4] Syme, English Botany, iv. 43 (1873).

[5] Barton & Castle, British Flora Medica, i. 242 (1845).

[6] Syme, English Botany, iv. 46 (1873).

[7] "Il est employé dans la fabrication des liqueurs appelées ratafia et cassis" — De Candolle, Origine des Plantes Cultivées, 222 (1883).

botanical writers of the North with the true Grape (*Vitis*). This second "Wine-berry" is *Vaccinium Vitis-Idaea*, the little berry known in northern New England and Canada as the Rock Cranberry or Mountain Cranberry; in England and Scotland as Red Whortle-berry, Cowberry, Ling-berry, or Wine-berry; in Germany as *Preisselbeere* or *Steinbeere*; in Denmark and Norway as *Tytebaer* or *Tyteling*; and in Sweden as *Lingon*. By the herbalists, at least as late as the end of the 16th century, this plant was supposed to be a true Grape, and was identified with the *Vitis Idaea* of Pliny; but in 1597 Gerarde pointed out, that the plant to which this name had been generally applied by students of northern Europe was not the true *Vitis Idaea* of the Ancients. In Gerarde's words, "Whortle berries are called in high Dutch *Heydelbéeren*: in lowe Dutch *Crackebesien*, bicause they make a certaine cracke whilest they be broken betweene the teeth, of diuers *Hauerbesien*:....and we in England Whortes, Whortle berries....and in some places Winberries. .... Most of the shops of Germanie do call them *Myrtilli*, but properly *Myrtilli* are the fruite of the Myrtle tree, as the Apothecaries name them at this day. This plant [*Vaccinium Vitis-Idaea*] hath no name for ought we can learne, either among the Greekes or auncient Latines: for whereas most do take it to be *Vitis Idaea*, or the Corinth tree, which *Plinie* surnameth *Alexandrina*, it is vntrue; for *Vitis Idaea* is not onelie like to the common Vine, but is also a kinde of Vine....This Vine which groweth neere to mount Ida, is reported to be like a shrub, with little twigs and branches of the length of a cubite, about which are grapes growing aslope, black, of the bignes of a Beane, sweete, hauing within a certaine winie substance, soft: the leafe of this is rounde, vncut and little....And with this description the little shrub [*Vaccinium Vitis-Idaea*] which the Apothecaries of Germanie do call *Myrtillum*, doth nothing at al agree, as it is very manifest; for it is low, scarce a cubite high, with a few short branches not growing to a cubite in length: it doth not bring foorth clusters or bunches, nor yet fruite like vnto grapes, but berries like those of the Yew tree; not sweete, but somewhat sower and astringent, in which also there are many little white flat seedes....Moreouer it is thought that this is not found in Italy, Greece, or in lesser Asia, for that *Matthiolus* affirmeth the same to grow no where but in Germanie and Bohemia, so farre is it from being called or accounted to be *Vitis Idaea*, or *Alexandrina*."[1]

[1] Gerarde, Herball, 1231 (1597).

This long but convincing extract is quoted as showing how firm had been the conviction in northern Europe previously to the time of Gerarde, that *Vaccinium Vitis-Idaea* was a true Grape. And although the name "Wine-berry" is no longer in general use for *Vaccinium Vitis-Idaea,* it was still known to the herbalists in 1633. At that time, Thomas Johnson, in a Table of English names "gathered out of antient written and printed Copies, and from the mouthes of plaine and simple country people," recorded the statement that "*Wyneberry is* Vaccinia." [1] And it is worthy of note that the learned Charles Pickering identified the "kind of red wine-beries," seen on the coast of Nova Scotia in 1623 as *Vaccinium Vitis-Idaea.*[2] In none of the modern Scandinavian floras is the writer able to find the name *Vínbaer* used for *Vaccinium Vitis-Idaea,* and it is possible that the name was used only in England and Scotland; but in many different regions in the North,— Norway, Sweden, Denmark, Germany, Switzerland, Siberia, etc. — wine, brandy or other alcoholic beverages were formerly prepared from the berries. Thus, Gunnerus, in his Flora of Norway, enumerating the uses of *Vaccinium Vitis-Idaea*, states on the authority of Johan Paulli, that "wine also can be made from the berries." [3] Liljeblad states that in Sweden "wine can be made from the berries." [4] In Denmark, likewise, "they make from the berries a sparkling drink, and a good brandy"; [5] and Gmelin, in his Flora of Baden tells us, that "the berries, especially in the northern regions, in Sweden and Russia, are preserved in various ways. . . . They likewise are ingredients in various beverages, various kinds of the drink called *Punch*. In Siberia, from the fermentation of the berries, mashed with a decoction of bruised rye, a pleasing sour drink, slightly inebriating, is produced. Our mountain people at Kaltbrunn [in Switzerland] distill from the mashed and fermented berries a pleasing spirit, strong and very limpid, which they sell under the name *Steinbeeren-Geist* or *Steinbeeren-Wasser.*" [6] Similarly, in the region of the Black Forest in Baden,

[1] Gerarde, Herball, ed. Johnson, Suppl. (1633).

[2] Chas. Pickering, Chronological History of Plants, 940 (1879).

[3] "Vinum *etiam ex baccis confici potest.*"— Paulli, Dansk oeconomisk urte-bog, 151 (1761), according to Gunnerus.

[4] "af båren kan tillagas vin" — Liljeblad, Svensk Flora, 139 (1792).

[5] "Der laves og en kislende Drik af Baerrene, og en god Braendeviin."
Hornemann, Forsøg til en dansk ockonomisk Plantelaere, 533 (1796).

[6] "Baccae praesertim in regionibus borealibus, in Suecia et Russia vario modo condiuntur. . . . Sic etiam in varia potulenta, varia sic dicti *Punsch* genera ingrediuntur.
In Siberia ex fermentatione baccarum contusarum cum decocto Secalis comminuti,

"they prepare from them also by fermentation an esteemed spirit, known under the name of *Steinbeeren-Wasser*." [1]

From the facts here stated it is apparent, that there is no ground for supposing that the "*vínber*" of the early Norsemen was the true Grape; but that the name "*vínber*" long has been and still is the colloquial name for the Currant in both Norway and Sweden, and its equivalent, "Wine-berry," is still used for Currants in northern England and Scotland. Furthermore, the name "Wine-berry" was still in use at the last of the 16th and the first of the 17th centuries for the Mountain Cranberry (*Vaccinium Vitis-Idaea*), though the name in that sense soon disappeared from botanical writings. Currants and Rock or Mountain Cranberries were both confused by the most learned early botanical writers of northern Europe with the true Grape (*Vitis*) of southern Europe, and were generally supposed to be varieties or species of the Grape, because from both Currants and Mountain Cranberries the Norse as well as many other northern peoples made wine. Without question, then, the "*vínber*" of the early Norse was either the Red or Black Currant or the Mountain Cranberry; but before entering further upon that problem or discussing the fruits, on the Atlantic coast of North America, which the early Norsemen would have identified with their own familiar "*vínber*" and which they gathered to take back to Greenland, we may well attempt to determine some of the other plants mentioned by them, and especially to find what in Norway and Iceland they knew as "*hveiti*" (wheat) and as "*mǫsurr*" wood.

The "self-sown wheat" was long interpreted as Indian Corn, but in recent years the theory advanced by Schübeler [2] has been generally adopted, that the Wheat ("*hveiti*") seen by the Norsemen in Vínland was the American Wild Rice (*Zizania*). Following this interpretation Reeves remarks: "there can be little doubt that this 'self-sown wheat' was wild rice. The habit of this plant, its growth in low ground as here described, and the head, which has a certain resemblance to that of cultivated small grain, especially oats, seem clearly to confirm this

potus gratus acidus, leviter inebrians producitur.— Georgi, Reisen, t. i. p. 208.

Monticolae nostrates auf dem *Kaltenbrunn* ex baccis contusis fermentatis spiritum gratum fortem limpidissimum destillant, quem sub nomine *Steinbeeren-Geist, Steinbeeren-Wasser* vendunt."— Gmelin, Flora Badensis, ii. 151 (1806).

[1] "Dans le Schwarzwald...on en prépare aussi par fermentation une eau-de-vie estimée, connue sous le nom de Steinbeeren-Wasser."

Kirschleger, Flore d'Alsace i. 388 (1852).

[2] Schübeler in Forhandlinger i Videnskabsselskabet i Christiania 1858, 21–30 (1859).

view. The explorers probably had very slight acquaintance with cultivated grain, and might on this account more readily confuse this wild rice with wheat. There is not, however, the slightest foundation for the theory, that this 'wild wheat' was Indian corn, a view which has been advanced by certain writers. Indian corn was a grain entirely unknown to the explorers, and they could not by any possibility have confused it with wheat, even if they had found this corn growing wild, a conjecture for which there is absolutely no support whatever." [1]

No one who is familiar with Indian Corn and with Wheat will question the conclusion, that they are not likely to be mistaken for each other; but, until reading the above note, we should have supposed, also, that there was no possibility of anyone confusing Wheat and Wild Rice. Wheat is a narrow-leaved, comparatively low grass, with a subcylindric or finger-shaped close spike of grains (either with or without long awns or "beard") and it is cultivated in fields or dryish meadows; but Wild Rice (which, by the way, is confined to North America and therefore, like Indian Corn, "was a grain entirely unknown to the explorers") is one or our largest grasses, ordinarily three to eight feet high, with leaves an inch or more wide, and with the flowers and grains in a loose open panicle 12 to 16 inches long and 2 to 6 inches in diameter. Furthermore, Wild Rice (*Zizania*) is an aquatic plant, growing in the margins of lakes and quiet streams, especially in the region of the Great Lakes and the upper Mississippi; and, though it occurs locally in a few New England rivers, it attains its easternmost known limit in the lower reaches of the St. John in New Brunswick, being apparently unknown in Nova Scotia.

Although to a botanist there seems as little ground for assuming that the Wheat ("*hveiti*") of the sagas was Wild Rice as there is for identifying it with Indian Corn, there are, among the more than two hundred indigenous grasses which are found near the coast from New England northward, ten [2] or more species which, in superficial aspect, are closely similar to the true Wheat (*Triticum vulgare*). Of these ten or more native grasses the species of *Agropyron* demand brief discussion, for by many authors they are united with *Triticum*, the true Wheat; and in modern works upon the Norwegian and Icelandic floras they

[1] Reeves, The Finding of Wineland the Good, 174 (1890).

[2] *Agropyron* (or *Triticum*) *caninum*, *A.* (or *T.*) *pungens*, *A.* (or *T.*) *tenerum*, and *A.* (or *T.*) *violaceum*, *Elymus arenarius*, *E. canadensis*, *E. mollis*, and *E. virginicus*, *Hordeum jubatum*, and *Ammophila arenaria*.

bear the name *Hvede*. Thus *Agropyron* (or *Triticum*) *caninum* is called *Hunde Hvede*,[1] *Hundahveiti*,[2] and *Kjarrhveiti*;[3] and *Agropyron* (or *Triticum*) *violaceum* is called *Bláhveiti*.[4] These names, however, *Hunde Hvede* and *Hundahveiti* (Dog Wheat), *Kjarrhveiti* (Cur Wheat), and *Bláhveiti* (Blue Wheat) are evident translations of the botanical names, *Triticum caninum* and *T. violaceum*; and, like many such names in American botanical writings, suggest too strongly a book-origin. None of the northern species of *Agropyron* (or *Triticum*), furthermore, furnish useful grains; and, with the exception of the well known garden-weed, Witch-grass or Quick-grass (*Agropyron repens*), they are ordinarily overlooked by any one but the technical botanist.

Besides the true Wheat (*Triticum vulgare*), and its immediate allies, the wild species of *Agropyron* (or *Triticum*) which in technical writings of northern botanists are called species of wheat, there is one grass which, in Norway and Iceland, is known by the common people as Wheat. This is *Elymus arenarius*, the most conspicuous grass of the sea-strands, which has almost innumerable folk-names, among them *Strandhvede*[5] (Strand Wheat), *Sandhavre*[6] (Sand Oat), *Hvedegraes*[6] (Wheat-grass), *Havgraes*[6] (Oat-grass), *Vild Hvede*[6] (Wild Wheat), *Melr*[7], *Melgras*[7] (Meal-grass), *Melur*[8] and *Sandmelgras*[9] (Sand Meal-grass). Magnus Stephensen, as translated by the eminent British botanist, Sir William Jackson Hooker, tells us that it was the plant depended upon by the Icelanders, in the 18th century, for their flour. Stephensen, describing the tremendous volcanic eruption, which occurred in 1783 in the district of Iceland called Vester-Skaptefield's Syssel, says: "The loss sustained in this district by the destruction of the ground which used to produce the Sea Lyme-grass (*Elymus arenarius*) is the more deeply felt, since this plant has become an article of consequence among the inhabitants. The flour it yields is considered to be finer in quality and more nutritive than any which is imported; so that, although the drying and preparing of the grain are but imperfectly understood in this district, it was nevertheless in so

1 Blyt, Norges Flora, 164 (1861).
2 Hjaltalín, Íslenzk Grasafraedi, 114 (1830).
3 Stefán Stefánsson, Flóra Íslands, 48 (1901).
4 Stefán Stefánsson, Flóra Íslands, 47 (1901).
5 Gunnerus, Flora Norvegica, pars 1, 73 (1766).
6 Hornemann, Forsøg til en dansk oekonomisk Plantelaere, 642 (1796).
7 Grønlund, Islands Flora, 122 (1881).
8 Stefán Stefánsson, Flóra Íslands, 46 (1901).
9 Hjaltalín, Íslenzk Grasafraedi, 113 (1830).

general use, that little or no other corn [1] was bought at the trading towns." [2]

Schübeler, quoting from Olafsen and Povelsen, gives more details of the use in Iceland in recent times of *Elymus arenarius* (*Strandhvede, Sandhavre, Vild Hvede, Melr*, etc.) as a substitute for Wheat, and traces its use back as far as the first of the 11th century. His account is so illuminating that it may here be quoted in full.

"In Iceland, in case of famine, people have often used the seeds of the Strand Oat [*Elymus arenarius*] as a substitute for wheat; indeed, not rarely have they even preserved life with this alone. The ears are dried on iron plates over the fire, after which the seeds are easily beaten out. One must be satisfied, however, if one secure a ton of wheat (of 139 liters) from a quantity of ears for the transport of which 40 horses are required.

"In Skaptafells Syssel on the south coast of Iceland the Strand Oat even now finds very common use as a substitute for Grain. After the seeds have been beaten out, the straw is, of course, used for the roofs of houses. Apparently in Iceland, even in the year 1000 or in the beginning of the 11th century, the Strand Oat was used as a substitute for grain. We read, for example, that near Hitaraa (in Myrasyssel on the west coast of Iceland, 64° 40′ north latitude) there is an island from which much profit is derived both from the catching of seals and the gathering of sea-birds' eggs; grass and grain ('*saedi*') also grow here [Bjórn Hitdölakappe's Saga, p. 22]. Directly after this, we are told, that the house-servants voyaged to the island, in order to stack the grain. Naturally, neither barley nor any other common kind of grain can be meant here. The learned Icelander, *Gudbrand Vigfusson* gives in his Icelandic-English Dictionary the word '*melr*,' which occurs here, as '*a kind of wild Oats esp. Bent-grass*' (compare *Agrostis*) [3] and remarks, that by this [Bent-grass] is meant *Arundo arenaria* L. Since, however, the Sand Reed [*Arundo arenaria* = *Ammophila arenaria*] occurs but rarely in Iceland,[4] while, on the

[1] "Corn," i. e. *corn* of the English, or Wheat.

[2] Magnus Stephensen, Kort Beskrivelse over den nye Vulcans Ildsprudning i Vester-Skaptefield's Syssel paa Island i aaret, 1783 — translated by W. J. Hooker, Journal of a Tour in Iceland, ed. 2, ii. 226 (1813).

[3] Schübeler here inserts the parenthetical "*Agrostis*" not because it bears specially upon the discussion but because, at least in English speaking countries, the species of *Agrostis* are commonly called "Bent-grass."

[4] It is doubtful if *Arundo* (or *Ammophila*) *arenaria* occurs at all in Iceland. It is not recorded from there either in Grønlund's *Íslands Flora* (1881) or in Stefán Stefánsson's *Flora Íslands* (1901).

other hand, *Elymus arenarius* is pretty common on the coast, and here and there even in great quantity, it seems to me obvious, that it must unquestionably be the seeds of this grass, which in ancient times as still at the present day have been used as a substitute for grain. Everyone, who knows the seeds of these two species, will readily concede, that it would occur to nobody to use the seeds of *Arundo arenaria* as a substitute for wheat, and least of all if he has the choice between this and *Elymus arenarius*." [1]

When we consider the facts: that, in the neighborhood of Reykjavík in Iceland, "all attempts, that have been made in the most sheltered parts of the place to cultivate firs and other hardy trees, have universally failed, as have those which have been made for the cultivation of corn [wheat]"; [2] that the Icelanders in the 11th century had a wild grain which they took great pains to harvest, and at the present time are largely dependent upon the seeds of the wild *Elymus arenarius* which many prefer to the imported Wheat; and that this grass bears in Iceland or Scandinavia such folk-names as Wild Wheat, Strand Wheat, Wheat-grass, Sand Oat, "*Melr*," and Meal-grass, while the other grass (*Arundo arenaria*) which has been suggested (by Vigfusson)

[1] "Auf Island hat man bei Hungersnoth mehrmals den Samen des Strandhafers als Kornsurrogat benutzt; ja nicht selten soll man sogar allein hiermit das Leben erhalten haben. Die Aehren werden auf Eisenplatten über Feuer getrocknet, wonach der Same sich leicht ausklopfen lässt. Man muss sich aber zufrieden stellen, wenn man eine Tonne Korn (à 139 Liter) von einer Quantität Aehren erzielt, zu deren Transport 40 Pferde erforderlich sind [Eggert Olafsen's og Bjarne Povelsen's Reise].

In Skaptafells Syssel an der Südküste Islands findet der Strandhafer noch jetzt sehr allgemaine Anwendung als Getreidesurrogat. Nachdem die Samen ausgedroschen, bedient man sich natürlich des Strohes zum Decken der Häuser. Wahrscheinlich hat man auf Island schon ums Jahr 1000 oder im Anfange des 11ten Jahrhunderts den Strandhafer als Getreidesurrogat angewandt. Es heisst nämlich: Bei Hitaraa (in Myrasyssel an der Wesküste Islands, 64° 40′ N. B.) liegt eine Insel, die sowohl durch Seehundefangst wie durch Einsammeln von Seevögeleiern sehr einbringend ist; auch Gras und Korn (‚*saedi*') wächst hier' [Björn Hitdölakappe's Saga. pag. 22]. Gleich darauf heisst es, dass die Dienerschaft des Hauses hinaus auf die Insel reiste, um das Getreide in Haufen zu bringen. Natürlich kann hiermit weder Gerste noch eine andere allgemeine Getreideart gemeint sein. Der galehrte Isländer Gudbrand Vigfusson giebt in seinem isländischen Wörterbuche das Wort '*melr*,' welches hier vorkommt, wieder mit, ‚*a kind of wild Oats esp. Bent-grass'* (ↄ: Agrostis), und bemerkt, dass damit Arundo arenaria, L. gemeint sei. Da jedoch das Sandrohr auf Island nur selten, während dahingegen Elymus arenarius ziemlich allgemein an der Küste, und hier und da sogar in Menge, vorkommt, scheint es mir einleuchtend, dass es der Samen eben dieses Grases sein muss, dessen man sich sowohl im Alterthume wie noch heutigen Tages als Getreidesurrogat bedient hat. Jeder, der die Samen dieser beiden Arten kennt, wird gewiss einräumen, dass es Niemanden einfallen möchte die kleinen Samen der Arundo arenaria als Kornsurrogat zu gebrauchen, und am wenigsten wenn man die Wahl hat zwischen dieser und Elymus arenarius." — Schübeler, Die Pflanzenwelt Norwegens (Allgemeiner Theil) 119, 120 (1873).

[2] W. J. Hooker, Tour in Iceland, ed. 2, i. 34 (1813).

as the Iceland '*melr*' apparently does not grow in Iceland at all,[1] but in Norway and Sweden bears the names *Sand-Roir* (Sand Reed) and Margräs (Sea Grass); there can be no question that the "*hveiti*" of the early Norsemen was *Elymus arenarius.*

The "*mǫsurr*" wood mentioned in the sagas has generally been accepted as some species of Maple, and this interpretation prevails in the notable series of citations given in the Century Dictionary under MAZER. Yet, as stated by Reeves, "it has also been suggested that the word mausurr, *mǫsurr*, may be allied to the modern Swedish Masbjörk, veined-birch, German, Maser-birke, and again [cf. Grönl. hist. Mindesm. vol. i. p. 280] to the German Meussdorn, a view which Angrim Jonsson was the first to advance. . . . That the tree called *mǫsurr* was also indigenous in Norway is in a manner confirmed by a passage in the Short Story of Helgi Thorisson [Þáttr Helga Þórissonar], contained in Flatey Book [vol. i, p. 359]: 'One summer these brothers engaged in a trading voyage to Finmark in the north, having butter and pork to sell to the Finns. They had a successful trading expedition, and returned when the summer was far-spent, and came by day to a cape called Vimund. There were very excellent woods here. They went ashore, and obtained some '*mǫsurr*' wood.' The character of this narrative, and the locality assigned to the '*mǫsurr*' trees, affects the trustworthiness of the information. It is reasonably clear, however, that the wood was rare and, whether it grew in Finmark or not, it was evidently highly prized."[2]

The statement that "the locality [northward toward Finmark] assigned to the '*mǫsurr*' trees" in the Story of Helgi Thorisson "affect[s] the trustworthiness of the information," indicates Reeves's belief that the "*mǫsurr*" trees were Maple. It is certainly true that the Maple of Norway (*Acer platanoides*) is confined to the southern half of the country[3]; but Birch trees, according to the distinguished Norwegian botanist, Blytt, occur as far north as Finmark,[4] so that they could readily have been seen by Helgi and his companions on their return southward from that region.

[1] Though included by Hjaltalín in his *Íslenzk Grasafraedi* (1830), the Sand Reed (*Arundo* or *Ammophila arenaria*) is not recognized as an Iceland plant by either GrØnlund (1881) or Stefán Stefánsson (1901).

[2] Reeves, l. c. 170.

[3] See Blytt, Norges Flora, ii. 1087 (1876); also Nyman, Conspectus Florae Europaeae 135 (1878).

[4] See Blytt, Norges Flora, i. 402, 403 (1861).

When we turn to the writings of Scandinavian botanists, we find the name *mösurr* or *masur* applied only to the Birch. Thus the immortal Linnaeus, writing in 1737 of the Birch trees of Lapland, says: "*Knobs, tuffs, protuberances* or prominences are often put forth in old birches from the middle of the trunk, which are firmer than the rest of the wood, since they consist of fibres twisted and entwined (*Masurlupne*). From these they [the Laplanders] make their small vessels for foods and drink, generally carved into a roundish form, with only a quarter part removed above, and with a handle affixed." [1] Later, in his *Flora Suecica*, Linnaeus speaks of one of the forms of *Betula* as *Masurbiörk*.[2] More recently, Areschoug in his *Skånes Flora* tells us that *Betula verrucosa* [*pendula*] is called *Masurbjörk*.[3] In Livonia "The bunches on the lower part of the trunk of the Birch we call *Birken-masern*." [4] Other northern botanists tell us of the *Masur*-birch, but the fullest discussion, apparently, is that given in the *Pflanzenwelt Norwegens* by Schübeler, who, after discussing other modifications and uses of the Birch, says: "We find very often, likewise, the Maser-formation (old Norse: *mösurr*, Swedish: *masur*), which, so far as I have observed, appears in two different forms, either as *Maser-knobs* or even in such a manner that practically the whole wood-mass of the trunk consists, for a length of several feet, of a peculiar distorted and as it were curled formation of the annual rings. Although this formation is not conspicuously noticeable upon the outside of the trunk, yet everyone who has once carefully observed such a tree, can detect the same easily among hundreds by the peculiar knotty, crackled bark. The *Maser-knobs* are apt to have a more or less well marked hemispherical form, and may reach a diameter of 1–2 feet (31–62 cm.). These seem to arise ordinarily as a result of the massing together (perhaps produced through outward injury) of neighboring buds; which, not reaching perfect development and consequently retarding and later checking the normal formation of the annual rings, take on the form of extremely peculiar wave-like curlings. The *Maser-knobs* were in olden times used here in Norway for

[1] "*Tubera, tophi, tubercula* seu prominentiae saepe exseruntur in antiquus Betulis ex medio caudice, quae tenaciora sunt reliquo ligno, cum fibris constent intortis & implicatis (Marsurlupne). Ex hisce conficiunt vascula sua pro ferculis & potu, communiter in formam subglobosam excauata, demta vnica quarta parte superius, cum adfixo manubrio."— Linnaeus, Flora Lapponica, 264 (1737).

[2] Linnaeus, Flora Suecica, 283 (1745).

[3] Areschoug, Skånes Flora, 143 (1866).

[4] J. B. Fischer, Versuch einer Naturgeschichte von Livland, 623 (1791).

bowls and other vessels for drink."[1] In support of the latter statement Schübeler quotes from the saga of Harald Haardraade an account of the use of a "*Mösurbolli*" in the year 1086.

Without quoting further botanical writings, all of which indicate that the name *Mösurr* or *Masur* has long been applied by the Norwegians and Swedes to a peculiar knob-like outgrowth which occurs upon the trunks of birch trees and from which bowls have been cut, we may conclude that, while similar outgrowths are sometimes found upon the Maple, Horse Chestnut, Cherry, and Aspen,[2] and have sometimes been put to similar use, there is little question that the "*mǫsurr*" wood best known to the early Norsemen was a peculiar knob-like formation upon the Birch, which was rare and very highly prized.

Having now determined with reasonable certainty the plants which were known to the early Norsemen as "*vínber*," "*hveiti*," and "*mǫsurr*" wood, we may appropriately inquire what plants, upon the eastern coast of North America, the Northmen might have seen, which they would identify with those familiar and economically important plants of Norway, Iceland, or Greenland.

In northern Europe there are at least three Currants which bear the name Wine-berry (*Vínber* or *Vínbär*): *Ribes rubrum* and the closely similar *R. vulgare* (*Vínbaer* or *Röda Vínbär*) and *R. nigrum* (*Svarte Vínbär*). Upon the coast of eastern America we have two Red Currants and two Black Currants. The Red Currant of our coast

[1] "Sehr häufig kommt auch die Maserbildung (alt. Norwegisch: *mösurr*, Schwed.: *masur*) vor, welche, so viel ich beobachtet, in zwei verschiedenen arten auftritt, entweder als Maserknoten, oder auch so, dass ziemlich die ganze Holzmasse des Stammes in einer Länge von mehreren Fuss, aus einer eigenthümlich verdrehten und gleichsam gekräuselten Bildung der Jahresringe besteht. Obgleich diese Bildung sich auf der Oberfläche des Stammes nicht auffallend bemerkbar,macht, kam doch ein Jeder, der einmal einen solchen Baum aufmerksam betrachtet hat, denselben leicht an der eigenthümlich knotig geborstenen Rinde unter Hunderten herausfinden. Die Maserknoten haben gern eine mehr oder weniger ausgeprägte Halbkugelform, und können einen Durchmesser von 1–2′ (31–62 cm.) erreichen. Dieselben scheinen gewöhnlich infolge einer, vielleicht durch äussere Beschädigung hervorgebrachten, Anhäufung von Nebenknospen zu entstehen, welche nicht zu vollkommener Ausbildung gelangend, und dadurch die regelmässige Bildung von Jahresringen hindern und letztere zwingen, die Form höchst eigenthümlicher wellenförmigen Windungen anzunehmen. Die Maserknoten wurden in älteren Zeiten hier in Norwegen zu Bollen, und andern Trinkgefässen benutzt."— Schübeler, Die Pflanzenwelt Norwegens (Allgemeiner Theil), 181, 182 (1873).

[2] "In dem heisigen botanischen Garten habe ich vor mehreren Jahren an 1–3^{cm} dicken Stämmen von Acer platanoides, Aesculus Hippocastanum, Prunus Cerasus and hauptsächlich an Populus tremula vollständige Maserbildungen in einer Länge von ½–1 Meter beobachtet" — Schübeler, l. c. 182.

which most closely resembles the European *Ribes rubrum* and *R. vulgare* (the shrubs commonly cultivated as Red Currants) is *Ribes triste*, a species so similar to *R. rubrum* that in American botanical writings it passed under that name until 1907, when its technical differences were admitted[1] by our botanists. This species, *Ribes triste*, occurs across subarctic America, and in the East extends southward along the coast to the vicinity of Eastport in easternmost Maine;[2] though among the mountains of the interior it is found southward as far as Mt. Greylock in western Massachusetts. The only other indigenous Red Currant of eastern America is *Ribes prostratum*, which differs from *R. rubrum* of Scandinavia and its American representative, *R. triste*, in having bristly instead of smooth berries and in an unmistakable and very powerful odor and flavor which have suggested for it the colloquial name "Skunk Currant." This species, the fruit of which, though unattractive to the average New Englander, is eaten with relish by the less sophisticated woodsmen of French Canada, abounds on rocky slopes and barrens in the northern part of the continent; and in the coastal region is known from Ungava Bay and Hopedale, Labrador, to southern Maine, reaching perhaps its southernmost coastal stations on the islands off Kennebunkport, where it was remarked by Champlain[3] in 1605 and where it still abounds. In the interior it follows southward among the mountains to Mts. Watatic and Wachusett in Massachusetts and the Taconic Mts. of northwestern Connecticut.

Of the two Black Currants of eastern America, one, *Ribes lacustre*, with bristly fruit, is found from the east coast of Labrador across the subarctic country to the mouth of the Mackenzie, and southward along the coast to the Cranberry Isles, off Mt. Desert, Maine, and

[1] See Fernald, Rhodora, ix. 1–3 (1907).

[2] Since the range of *Ribes triste* was worked out in 1907 and again for the 7th edition of Gray's Manual, limiting its northern range with Newfoundland, the writer has examined material, kindly loaned him by Dr. J. M. Macoun of the Geological Survey of Canada, from latitude 56° on the Labrador Peninsula, and has received characteristic specimens, collected at Eskimo Point on the southern coast of the Labrador Peninsula by Dr. C. W. Townsend. The southernmost coastal station yet known for this species is at Pembroke, Maine.

[3] "En ces isles y a tant de groiselles rouges que l'on ne voit autre chose en la pluspart, & vn nombre infini de tourtes [pigeons de passage], dont nous en prismes bonne quantité. Ce port aux isles est par la hauteur de 43. degrez 25. minutes de latitude." — *Les Voyages de Champlain* (ed. Laverdière), ed. 2, iii. 56. In May, 1895, Mr. Warren H. Manning and the present writer visited the islands off Cape Porpoise, Kennebunkport, to make as complete a canvass as possible of the flora, and found *Ribes prostratum* in profusion on Trott's Island.

doubtless to Penobscot Bay. In the interior of New England, however, it extends southward in cold upland woods and swamps to the mountains of northwestern Connecticut. The other Black Currant (*Ribes americanum*, often called *R. floridum*) is comparatively rare along the coast, but delights in the rich alluvium of streams, chiefly in the warm interior regions, growing from the St. John valley in New Brunswick to Assinaboia, south to Virginia, Nebraska, and adjacent regions.

The remaining Wine-berry of northern Europe, the Red Whortleberry of the English (*Vaccinium Vitis-Idaea*) is represented in Greenland only by the dwarfer arctic variety *minus* (var. *pumilum* Hornem.);[1] and this plant (var. *minus*)[2] is the common Red Whortleberry or Rock or Mountain Cranberry (*Pomme de terre* of the French Canadian),[3] which abounds from northern Labrador and the subarctic barrens of America southward on non-calcareous rocks to Newfoundland and the Gulf of St. Lawrence, and around the coast of Nova Scotia and southern New Brunswick to the islands of Penobscot Bay in Maine. South of Penobscot Bay *Vaccinium Vitis-Idaea* (var. *minus*) is very local indeed and it reaches its extreme southern limit at Danvers, Essex County, Massachusetts, where two very small isolated patches have been found,[4] the only ones known to the writer south of Penobscot Bay and the adjacent islands and the mountains of New Hampshire.

In determining the exact species of "*vínber*" which was gathered by the Norsemen in Vínland, we have a clue in the statement of the *Groenlandinga Þáttr* (in the Flatey Book), that "their after-boat was filled with '*vínberjum.*' A cargo [of wood] sufficient for the ship was cut, and when the spring came, they made their ship ready and sailed away." The inclination of some students has been to discredit the accuracy of this saga on the ground, that it would be impossible to gather "*vínber*" in the spring. Storm thus states with unequivocal emphasis his own ground for doubt, for to him the statement "evinces a remarkable want of knowledge concerning wine and grapes. These grapes are discovered in winter, nay even in spring (!). . . . . the grapes are gathered, too, in the spring (!) and the ship's boat filled with

[1] "Forma primaria in Groenlandia nondum observata est." — Lange, Conspectus Florae Groenlandicae, Pars 2, 268 (1887).
[2] See Fernald, Rhodora, iv. 231–234 (1902).
[3] Among the French of Quebec and Labrador the potato is commonly called *patate*.
[4] See John Robinson, Flora of Essex County, Massachusetts, 71 (1880).

them(!)"[1] It is certainly true that, if the Grape alone or even the Currants come into consideration, such an account should be discredited. But, as those who are intimate with conditions in Labrador, on the North Shore of the St. Lawrence or in the subarctic region of America, will inform us, *spring is the very season of the year when the fruit of Vaccinium Vitis-Idaea* (Mountain or Rock Cranberry, Red Whortleberry, WINEBERRY of the Middle Ages) *is in its prime.* Thus, Sir John Richardson, crossing subarctic America in his search for traces of Sir John Franklin, writes: "*Vaccinium Vitis-Idaea,* cow-berry, or alpine cranberry is the.... cranberry most plentiful and most used throughout Rupert's Land....and though inferior to the *V. oxycoccus* [the bog Cranberry of the North] in flavor in autumn, is far superior to it after the frosts; and, as it may be gathered in abundance in a most juicy condition when the snow melts in June, it is then a great resource to the Dog-ribs and Hare Indians, as well as to the immense flocks of water-fowl that are migrating to their breeding places at that date." [2] Dr. A. P. Low, Director of the Geological Survey of Canada, says: "*Vaccinium Vitis-Idaea,* Linn. (Cranberry, Pomme de terre) is the most important berry of the northern half of Labrador. South of latitude 51°, it is found only on the summits of barren rocky hills [In ancient Vínland, the "*vínber*" was found "wherever there was hilly ground"], or on barren islands in the larger lakes; but to the northward, as the open barren spaces increase, it soon becomes abundant, and about the Hamilton and Big rivers is very plentiful everywhere....Owing to the lasting qualities of the fruit and its improvement by frost, large quantities are gathered annually by the inhabitants, before the ground is covered with snow, for use during the long winter, throughout which the berries keep perfectly, and counteract the ill effects of the constant meat diet of the Indians and other inhabitants. The fruit is found in perfection, immediately after the disappearance of the snow in the spring, and continues good for several weeks, until the juices are dried up by the sun." [3] Again, Professor John Macoun, Naturalist of the Dominion of Canada, adds his evidence: "*V. Vitis-Idaea,* Linn. Cowberry. Mountain Cranberry. Very abundant from the Atlantic to the Pacific, producing enormous quantities of fruit, which are invaluable as a spring food for birds on their return from the south." [4]

[1] Gustav Storm, Studies on the Vineland Voyages, 19 (1889).

[2] Richardson, Arctic Searching Expedition, 432 (1852).

[3] Low, Report on Explorations in the Labrador Peninsula, in Geological Survey of Canada, Annual Report, n. s. viii. 39 L. (1897).

[4] Macoun, Catalogue of Canadian Plants, i. 293 (1884).

Considering these facts, it is most probable that the "*vínber*" of the sagas was *Vaccinium Vitis-Idaea*, which bears in its specific name a token of its long confusion by early botanists of northern Europe with the Grape, and which, at least as late as 1633, bore the folk-name "Wyneberry." Whether or not the claims of this particular Wineberry and of the Currant (which in modern times alone bears the name *Vínbaer* in Scandinavia) are now finally settled, their known distribution is so similar as to have no material influence upon the main geographic problem.

A very similar distribution is shown when we study the occurrence of the Strand Wheat (*Elymus arenarius*), which has been used as Wheat by the Icelanders since the discovery of their island. It occurs in the northern regions of Europe, including Iceland, in southern Greenland and up the west coast to latitude 70°, 47′;[1] and from eastern Baffin Land southward along the coast in great abundance to the Gulf of St. Lawrence, locally to Penobscot Bay, Maine, and very locally indeed south of Penobscot Bay, reaching its extreme southern limit on the Isles of Shoals (off Kittery and Portsmouth). The Strand Wheat, although not mentioned in recent discussions of Vínland, was, it is worthy of note, identified in 1749 as the "self-sown wheat" of the sagas. Peter Kalm, the Scandinavian traveler and explorer, writing in September, 1749, from Cap aux Oyes on the north shore of the St. Lawrence (west of Murray Bay), said: "The **Sand-wheat** (*Elymus arenarius*) was likewise abundant on the strands. Both of these [*Elymus arenarius* and the Sand Reed, *Arundo arenaria*] were called by the French **Seigle de Mer**. And, since I was assured, that both of these were to be found abundantly in Newfoundland as well as elsewhere along the sea-coast in northern America, and that the places, where these grow, look from a distance like fields of grain; we may by this be able to explain what in the old Norse sagas is said of **Wineland the Good**, namely, that even there self-sown wheat-fields had been found."[2] Thus Kalm gives his distinguished support to the present interpretation and antedates it by more than 160 years.

[1] See Ostenfeld, Flora Arctica, i. 134 (1902).

[2] "Der **Sandweizen** (*Elymus arenarius*) war gleichfalls an den Ufern häufig. Beide diese [*Elymus arenarius* und das Sandrohr, *Arundo arenaria*] wurden von den Franzosen **Seigle de Mer** genannt. Und da man mir versicherte, dass beide diese in Menge sowohl ben Terre neuve als anderswo gegen den Strand des Merres im nördlichen Amerika befindlich wären, und die Oerter, wo diese wachsen, von weiten als Getraideäcker aussehen: so dürfte man hiedurch ausdeuten können, was in den alten Nordischen Geschichtbüchern von **Winland der goda** gesagt wird, nehmlich, dass man daselbst von selbsten gesäete Weizenäcker gefunden hätte" — Peter Kalm, Reise nach dem nördlichen Amerika, iii. 515, 516 (1764).

It now remains only to determine our representative of the Scandinavian White Birch (*Betula alba*). This is obviously the Canoe Birch, which by some is thought to be inseparable as a species from the Scandinavian *Betula alba*, but by others is separated as a variety, or even as a species (*B. papyrifera*). The Canoe Birch is common in the Maritime Provinces of Canada and in the northern and upland regions of New England; but south of Essex County, Massachusetts, where it is local, it is almost unknown as a coastal species, though scattered colonies of it are found as far south as Long Island Sound. Northward, however, it crosses the interior of Labrador and follows up the coast, except on exposed mountains, headlands, and the outer islands, to the region of Hebron in latitude 58°.[1] "About Hamilton Inlet, birch is common, and, at the head of the inlet, trees up to 10 inches in diameter are not uncommon." [2]

Thus it will be seen, that the three plants which have been most depended upon in attempts to locate Wineland the Good,— "*vínber*," "*hveiti*," and "*mǫsurr*" wood — instead of being the Grape, the Indian Corn or Wild Rice, and the Maple (some of which species, by their known distribution, exclude from consideration [3] all coastal regions north of the Maritime Provinces) [4] are in reality the Mountain Cranberry or possibly one of the native Currants ("*vínber*"), the Strand Wheat ("*hveiti*") and the Canoe Birch (*mǫsurr*). And, although the Canoe Birch extends very locally southward on the coast to Long Island Sound, the Mountain Cranberry to Essex County, Massachusetts, and the Strand Wheat to the Isles of Shoals, the area of their greatest abundance is from the Lower St. Lawrence river northward along the coast of Labrador. The inevitable conclusion from these facts and its far-reaching significance must be obvious.

[1] See Low, Report on Explorations in the Labrador Peninsula, in Geological Survey of Canada, Annual Report n. s. viii. 30, 31 L (1897).

[2] Low, l. c. 32 L (1897).

[3] As an illustration of the use of the vegetation in locating Vínland, the following, from Professor E. N. Horsford's "*The Landfall of Leif Erikson*," p. 19 (1892), may be quoted: "*In Labrador* Indian corn does not ripen; it cannot, of course, grow *wild*. Why? *Unripe seeds do not germinate*. .... Grapes *grow wild* in southeastern New England. Grapes *do not grow* in Labrador. The first point, then, so far as vegetation is concerned, is that Labrador *could not have been* the Vineland.

"The second point is, that what is now southeastern New England *might have been* the Vineland of the Northmen, so far as the *forests and grapes and corn* are concerned."

[4] Though Grapes, Wild Rice, and Indian Corn do not grow so far north, several species of Maple extend northward to southern Newfoundland and the Gaspé Peninsula, at the mouth of the St. Lawrence; and one, the Mountain Maple (*Acer spicatum*) reaches the southern coast of the Labrador Peninsula.

One of the greatest obstacles to those, who have depended upon the assumed translation of the critical words, "*vínber,*" "*hveiti,*" and "*mǫsurr*" as Grape, Indian Corn or Wild Rice, and Maple, has been the reconciliation of the comparatively southern range of these plants with the accounts of the natives of Vínland. These people, the "Skrellings" "were small ('swarthy' in one version) men, and ill-looking, and the hair of their heads was ugly. They had great eyes, and were broad of cheek," and they came in "skin-canoes." Nearly all students of the sagas have agreed that these *seem to be* Esquimaux; but, in order to make the natives of Vínland, the "Skrellings," fit the geographic distribution of the Grape, many arguments, not at all convincing, have been put forward to prove, either that the Esquimaux formerly came to the coasts south of the St. Lawrence, or that, after all, the "Skrellings" were really Indians. Without entering now upon that question, which would lead us far from the subject of the present paper, it may be stated: that the mass of evidence which the writer has in hand, and which will soon be ready for publication, makes it clear that, if we read the sagas in the light of what we know of the abundant occurrence north of the St. Lawrence of the "*vínber*" (*Vaccinium Vitis-Idaea* or possibly *Ribes triste, R. prostratum,* or *R. lacustre*), "*hveiti*" (*Elymus arenarius*) and "*mǫsurr*" (*Betula alba,* i. e. *B. papyrifera* of many botanists), the discrepancies in geography, ethnology, and zoölogy, which have been so troublesome in the past, will disappear; other features, usually considered obscure, will become luminous; and the older and less distorted sagas, at least in their main incidents, will become vivid records of actual geographic exploration.

Gray Herbarium, Harvard University.

THE EXTENSION OF SOME RANGES IN EASTERN MASSACHUSETTS.

K. M. Wiegand.

In the April 1909 number of Rhodora there was published a list of rare plants found in the vicinity of Wellesley, Mass., in 1907 and 1908. During the past summer the survey of the Wellesley flora has been continued with the result that the following localities were found

for plants which ordinarily are supposed to be rare in Eastern Massachusetts, or have not heretofore been known in that region.

Cyperus aristatus Roth. This plant was found about the middle of August in great abundance below high water mark on the sandy strand surrounding Heard's Pond, Wayland. Later it was found in considerable abundance in a similar location at the southern end of Lake Cochituate. The plant is very local in Eastern Massachusetts. It has been found at Mystic Pond by Manning and Perkins, and at Brookfield by Harper (see herbarium of New England Botanical Club). Mr. F. F. Forbes informs me that he found it in 1904 and 1905 at Lake Cochituate.

Hemicarpha micrantha (Vahl.) Pax. This was found also in great abundance mixed with the last named plant on the strand of Heard's Pond. It was also found on the strand along the western shore of Farm Pond, Sherborn. This likewise seems to be a very local plant in Eastern Massachusetts, except possibly in the Cape Cod region where it is more abundant. There are specimens in the herbarium of the New England Botanical Club from Andover (*Blake*), and Brookfield (*Harper*). It has also been found by several botanists at Winter Pond, Winchester; and Mr. Forbes has collected it on a gravelly bank of the Charles River at Cow Bay, West Roxbury.

Potentilla palustris (L.) Scop., var. villosa (Pers.) Lehm. The plants of this species growing about the mill pond in the Charles River at South Natick have leaves densely silky beneath and from slightly to very conspicuously silky above, and glandular inflorescence. They should therefore be referred to this variety. Heretofore this variety apparently has not been known from south of Washington County, Maine, and the St. Lawrence System.

Viola affinis LeConte. A strange violet was found in considerable abundance in a rather low wild woodland on the east bank of the Charles River about one mile below Wellesley. It proved to be very typical *V. affinis* which, so far as the writer can learn, has not previously been reported from east of the Connecticut River.

Aralia nudicaulis L., var. elongata Nash. A patch of very peculiar looking wild sarsaparilla occurs in a woodland region just south of the Charles River at a point directly south of Needham Village. The narrowly lanceolate, long-acuminate leaflets agree well with Mr. Nash's description of this variety which he reported only from the Catskill Mts., New York.

Wellesley College.

A variety of Solanum new to America.— At Harpswell, Maine, July 10, 1909, I found a plant that Prof. Fernald has identified as *Solanum Dulcamara* var. *villosissimum* Desv., Pl. Angers, p. 112, 1818; not before reported in America. It would seem reasonable to suppose that it was an introduced plant, but the station is not one where a recent introduction would be expected. It grew in a small open space in the thick spruce woods of Ash Point, accessible by cow and sheep paths, but by no regular road or path, and with no houses at all near. In the middle of this opening grew a single clump of the plant. My attention was attracted by the white flowers on stiff woody stems, a combination I had never before seen in a Solanum. Prof. Fernald tells me that the color of the flowers is not sufficient to distinguish it from the typical form, as white-flowered plants of the latter have been observed. The really distinctive characters are the very strong, woody stems, and the densely pubescent foliage.— F. S. Collins, Malden, Massachusetts.

Two Vermont Grasses Rediscovered.— When the Vermont flora was issued in 1900 by Brainerd, Jones and Eggleston there was given a list of plants, reported for the state by the earliest botanists, which were not included in the flora because they had not been collected since nor were there any specimens extant to verify the existence of the species in Vermont. Among these plants were two grasses, *Eragrostis capillaris* Nees and *Muhlenbergia sobolifera* Trin., taken from the list of William Oakes published in 1852. Both of these grasses were rediscovered last summer by the writer at Twin Mountain in West Rutland, growing in thin soil on rocks in a territory much burned over. The *Eragrostis* was in great abundance but comparatively few plants of the *Muhlenbergia* were seen, growing with *Muhlenbergia racemosa*. The mountain is a noted botanical ground, being the station for a number of plants of more southern distribution.— George L. Kirk, Rutland, Vermont.

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JANE LORING GRAY.

The death of Mrs. Jane Loring Gray, July 29, 1909, at Beverly, Mass., must have recalled to many of the readers of Rhodora pleasant memories of the days when they were welcomed at the old house in the Botanic Garden by Mrs. Gray and her husband, Asa Gray. Although Mrs. Gray was not herself a botanist, through her sympathy with her husband in his scientific work she became acquainted with most of the American botanists of his time and, as his companion during his travels in Europe, she met many distinguished foreign botanists of the last generation as well as some of the botanical lights of a still earlier generation. Her charming manner made her everywhere welcome and to her quick appreciation of all that was worth seeing and hearing was added an excellent memory which enabled her to picture to a younger generation the personal appearance, habits and surroundings of their distinguished predecessors.

Mrs. Gray, a daughter of Mr. Charles Greely Loring, was born in Boston, Aug. 27, 1821, and first became acquainted with her future husband in 1844 while he was delivering a course of lectures at the Lowell Institute in Boston. They were married on May 4, 1848. During the rest of her long life she lived at the Botanic Garden where all botanists were received with a hospitality in which simplicity lent an added charm to cordiality, so that even the bashful and those accustomed only to a rougher mode of life felt at once at home. They never forgot Mrs. Gray nor did she forget them. Never robust and during much of her life an invalid, Mrs. Gray was nevertheless able to endure the fatigues of travel better than many stronger persons. She accompanied her husband twice to California and went with him to Mexico when she had reached an age at which few persons would

care to make such a journey. She also went with him to England in 1850, sailing in a packet, as the longer voyage was expected to benefit her health, and later they made several other trips to Europe, the last being in 1887 shortly before Prof. Gray's death, Jan. 30, 1888.

After her husband's death Mrs. Gray led a quiet life always interested in botanists and their work and always glad to see visiting botanists until with advancing years she was forced to live in retirement. For several years she was absorbed in the arrangement of her husband's correspondence and edited the Letters of Asa Gray, which appeared in 1893 in two volumes. The Gray Herbarium, which had become the property of Harvard University, had but slight endowment, wholly inadequate to provide for its care and development. In 1899, however, the announcement was made of an anonymous offer of $20,000 to found an Asa Gray Professorship of Systematic Botany, a position to be united with the curatorship of the Gray Herbarium. The offer was made conditional on the raising of at least $30,000 as a Gray Memorial Fund for the further endowment of the Gray Herbarium. The required sum was raised, but even the University authorities were in ignorance of the name of the person who had made the offer. It was Mrs. Gray, and botanists will be glad to know that it was the wife of Prof. Gray, who, by her very substantial gift, awakened the new interest and initiated the movement which has led in recent years to a much more effective endowment of the herbarium which he founded.

Mrs. Gray's last days were passed with her family, who were always devoted to her. Had she lived a month longer she would have reached her 89th year, a life as long as it was happy and useful. The funeral services were held in the old house in Cambridge and, as they departed, the friends felt not only that an old friend had been taken from them but also that the house so rich in associations with the past was closed to them forever.— W. G. F.

A SYNOPSIS OF THE SPECIES OF ARCTIUM IN NORTH AMERICA.

M. L. Fernald and K. M. Wiegand.

For some time it has been apparent that the burdocks found in waste land in various parts of eastern America do not fall readily into the two or three catagories provided for them in our current manuals. Field observations during the past summer, and study of the accumulated material in the Gray Herbarium and the Herbarium of the New England Botanical Club, show that we have, established in America, four species which are commonly recognized by Old World botanists as growing in Europe. The peculiarities of the achenes, corollas, involucral bracts, and leaves, which are emphasized in European handbooks, so regularly accompany characteristic arrangements of the heads in the inflorescence, that upon the combination of these characters it is possible to classify all but the most immature material which has been examined.

As judged from the conclusions of European authors, the species of this genus hybridize rather freely, and therefore in this country we should expect occasional more or less intermediate hybrid forms. But as yet so little attention has been given to the genus in America that we are unable to state to what extent our own plants hybridize.

Plants with leaves somewhat laciniate or coarsely toothed have been reported from time to time as forms of *A. Lappa*, *A. minus* and *A. tomentosum*. One of the earliest records in America of such a variation was in Darlington's Flora Cestrica (1837) where Darlington said: "A variety has been observed here, occasionally, with pinnatifid leaves" (p. 436). Specimens collected by Darlington have nondescript inflorescences and on his label he states that "The inflorescence always has a kind of half-starved or semi-abortive appearance." A similar form has recently been described in an unsigned note in The American Botanist (xv. 83, 1909) as *A. minus* f. *laciniatum*, in which the "inflorescence was irregular with numerous small sterile flowers." The plants of this general character that we have seen have all the appearance of being teratological developments caused by some disturbing influence, and hardly merit special taxonomic treatment.

On account of certain obvious characteristics of the burdocks most

collectors are inclined to ignore them, and from this it follows that little material finds its way into the public herbaria. We are therefore unable to state full ranges for any of the species; but by the citation of characteristic specimens examined it is hoped that the following synopsis may be made more readily intelligible.

A. Heads corymbose, long-peduncled: leaf-blades round-ovate, obtuse; petioles strongly angular, deeply furrowed.
- *Petioles solid: heads very large and broad*, 3–4.5 cm. in diameter;[1] *involucre glabrous*, green (rarely purple): *outermost bracts about* 1 *cm. long; the middle and inner* slightly longer, *subequal and exceeding the corollas; the innermost with pale firm slender gradually attenuate tips*: broad upper portion of corolla shorter than the slender tube: *achenes* 6–7 mm. long, *fawn-color*, often dark-mottled, *slightly rugose below the crenate-bordered summit*. . . . . 1. *A. Lappa.*
- *Petioles hollow: heads smaller*, 2–2.7 cm. broad: *involucre* more or less *arachnoid: outermost bracts* 4–7 *mm. long; the middle and inner successively longer*, all or all but the inner conspicuously *shorter than the corollas; the innermost with membranous more or less colored blunt or cuspidate tips*: broad upper portion of the corolla as long as the tube: *achenes* 4.5–7 mm. long, *gray*, usually dark-mottled, *rugulose from base to the entire summit*. . . . . 2. *A. tomentosum.*

B. Heads racemose or subracemose, rarely long-peduncled: leaf-blades ovate-oblong, usually less obtuse; petioles slightly angular.
- Petioles hollow: heads medium, 2.5–3.5 cm. broad: involucre glabrous or arachnoid, green or purplish: outermost *bracts* short, 5–7 mm. long; *the middle and inner* successively much longer, *equaling or exceeding the corollas*; the innermost long-attenuate, firm and aristate: upper and lower portions of the corolla equal in length: *achenes* 5.5–7.5 mm. long, *dark-brown*, sometimes light-mottled, not rugulose, the summit entire. . . . . 3. *A. nemorosum.*
- Petioles hollow: heads small, 1.5–2.5 cm. broad: involucre glabrous or arachnoid, green or purplish: the outer *bracts* short; *the middle and inner* successively much longer, all *conspicuously shorter than the corollas*; the innermost attenuate, firm and aristate: upper and lower portions of the corolla equal in length: *achenes* 5–6 mm. long, *gray or ashy-brown*, usually dark-mottled, smooth or faintly rugulose, the summit entire. . . . . 4. *A. minus.*

1. A. Lappa L. Sp. Pl. 816 (1753). *Arctium majus* Bernh. Syst. Verz. Erfurt. 154 (1800). *Lappa officinalis* All. Fl. Ped. i. 145 (1785). *Lappa major* Gaertn. Fruct. ii. 379 (1791). *Arctium Lappa*, var. *majus* Gray, Syn. Fl. i. pt. 2, 397 (1878).— Typical specimens examined. New Brunswick: dry roadside, Four Falls, Aug-

[1] These measurements of the heads include the spreading tips of the bracts.

ust 14, 1901 (*B. L. Robinson*). MAINE: roadside, Houlton, August 12, 1909 (*Fernald & Wiegand, Fernald*, no. 2269). NEW HAMPSHIRE: Tamworth, September 6, 1903 (*F. S. Collins*); Walpole, August 4, 1900 (*Noyes and Fernald*, no. 380); near dwellings, Jaffrey, July 29, 1897 (*B. L. Robinson*, no. 298). VERMONT: roadside, Westmore, July 26, 1896 (*E. F. Williams*). MASSACHUSETTS: Malden, July 31, 1887 (*F. S. Collins*); Sherborn, August 3, 1909 (*Miss M. L. Loomis*); waste land, Boston, August 11, 1898 (*E. F. Williams*). CONNECTICUT: Plainville, August 31, 1904 (*L. Andrews*).

The typical form of this species has an involucre which is green throughout.

Var. **purpurascens** (LeGrand) n. comb. *Lappa major*, sub-var. *purpurascens* LeGrand, Bull. Assoc. franc. Bot. ii. 69 (1899).— Involucre strongly suffused with purple. – Typical specimen examined from VERMONT: roadside, Cornwall, August 22, 1900 (*E. Brainerd*).

2. A. TOMENTOSUM Mill. Gard. Dict. ed. 8 (1768). *Arctium Lappa β*, L. Sp. Pl. 816 (1753). *A. Bardana* Willd. Sp. Pl. 1632 (1804). *A. Lappa*, var. *tomentosum* Gray, Synop. Fl. I, pt. 2, 397 (1878), at least as to synonyms. *Lappa tomentosa* Lam. Fl. Fr. ii. 37 (1778). – Typical specimens. MASSACHUSETTS: vacant lot, corner Parker Street and Buckingham Street, Cambridge, July 9, 1886 and July 28, 1908 (*Walter Deane*); waste ground, Cambridge, August 30, 1908 (*C. A. Weatherby*, no. 3); field where rubbish had formerly been dumped, Westford, July 12 and 21, 1909 (*Miss E. F. Fletcher*). CONNECTICUT: waste ground, Naugatuck, July 19, 1908 (*A. E. Blewitt*, no. 16).

3. A. NEMOROSUM Lejeune in Lejeune & Courtois, Comp. Fl. Belg. iii. 129 (1836). *A. intermedium* Bab. Man. Brit. Bot., ed. 8, 202 (1881).

This species is very variable and seems to occur with us in three pronounced forms which, owing to the need of further observations in the field and of clearer understanding of the Old World variations, it seems wisest to treat for the present without names. The condition in Europe is somewhat as follows. In many European manuals, in addition to the four species here treated, a fifth is given which is said to differ from *A. nemorosum* in having long-peduncled larger heads with the involucre more open above and more or less arachnoid. This is the *A. intermedium* of Lange (Dansk. Fl. ed. 1, 463, 1851), *A. pubens* of Babington (Ann. & Mag. Nat. Hist. ser. 2, xvii. 376, 1856), *Lappa intermedia* of Reichenbach (Icon. Fl. Germ. xv. 54, t. 812, 1853) also of Lange (Fl. Dan. t. 2663, 1861), and *A. majus*, sub-sp. *nemorosum* of Rouy and Foucaud (Fl. Fr. ix. 95, 1905). The exact status of this fifth species, however, is very confused, both as to whether it is distinct

from *A. nemorosum* and as to just what forms the authors of *A. nemorosum, pubens,* and *intermedium* had in mind when these names were published. The confusion in Great Britain, especially, is well summed up by Beeby in the Journ. Bot. xlvi. 380–382 (1908), who concludes after a study of authentic specimens of Lange's *A. intermedium*, that his species, so far as those specimens are concerned, consists of two forms: "first, a rather large-headed form of *A. minus* corresponding to var. *purpurascens* Blytt," and "secondly, the hybrid *A. majus* × *minus*." Beeby, in his study of the genus *Arctium*, also obtained a presumably authentic specimen of *A. nemorosum* collected by Lejeune himself and found it to be a form with heads agglomerated and almost sessile, rather than long-peduncled, and therefore agreeing both with the original description and also with the interpretation of most recent authors except Rouy & Foucaud. He says "I very much doubt whether we have any fourth species [in Great Britain] to support the name *A. pubens* Bab. If so, I am unacquainted with it, though I believe that Messrs. Groves are satisfied of the existence of such a plant."

Among our American forms the one here treated as *A. nemorosum*, form *a* agrees most closely with what the type is supposed to be. The form *c*, on the other hand, agrees fairly well with the description of *A. intermedium* Lange and *A. pubens* Bab.; but considering the doubt in the minds of European authors as to the exact status of these names and also the fact that, in America at least, the form here called form *b* combines characters of both form *a* and form *c*, it seems unwise at present to attribute any names whatever to the three forms here described. Whether they are really distinct forms, and what relation they bear to the above names cannot be determined with our present inadequate knowledge.

(*a*) Heads sessile or subsessile, the uppermost tending to be clustered: involucre glabrous to slightly arachnoid.—Typical specimens. Maine: around dwellings, Orono, September, 1889 (*Fernald*). New Hampshire: near dwellings, Jaffrey, July 27, 1897 (*B. L. Robinson*). Massachusetts: Springfield, August 17, 1904 (*L. Andrews*). Rhode Island: Providence, September 19, 1899 (*J. R. Churchill*). Connecticut: roadside, Southington, August 25, 1904 (*L. Andrews*). Illinois: waste places, St. Clair Co., August 14, 1893 (*H. Eggert*). Kansas: woods, Riley Co., August 24, 1895 (*J. B. Norton*, no. 307).

(*b*) Heads scattered and peduncled: involucre glabrous or essentially so.—Typical specimens. Quebec: vicinity of Cap à L'Aigle, July 27, 1905 (*J. Macoun*, no. 68,237). Maine: Pembroke, July 23, 1909 (*Fernald & Wiegand*); Manchester, September 9, 1873 (*F. L. Scribner*).

(*c*) Heads scattered and peduncled: involucre copiously arachnoid. — Typical specimens. MAINE: Fort Fairfield, August 9, 1909 (*Fernald & Wiegand*); Dover, September 1, 1894 and August 28, 1896 (*Fernald*); North Berwick, September 5, 1894 (*J. C. Parlin*). MASSACHUSETTS, Stockbridge, August 23, 1902 (*R. Hoffmann*).

4. A. MINUS (Hill) Bernh. Syst. Verz. Erfurt. 154 (1800). *Lappa minor* Hill, Veg. Syst. iv. 28 (1762). *A. Lappa*, var. *minus* Gray, Syn. Fl. i. pt. 2, 397 (1878). Typical specimens. MAINE: Houlton, August 12, 1909 (*Fernald & Wiegand*); Rumford, 1887 (*J. C. Parlin*); Hanover, September 10, 1889 (*J. C. Parlin*); East Auburn, August 27, 1896 (*E. D. Merrill*, no. 556); North Berwick, August 31, 1894 (*J. C. Parlin*). NEW HAMPSHIRE: Walpole, August 4, 1900 (*Fernald*, no. 377); VERMONT: Manchester, July 12, 1898 (*M. A. Day*, no. 104). MASSACHUSETTS: Malden, August 8, 1886 (*F. S. Collins*); Cambridge, August 30, 1908 (*C. A. Weatherby*, no. 2); Oak Island, Revere, August 20, 1882 (*H. A. Young*); Boston, August 17, 1866 (*Wm. Boott*); Blue Hills, September 1, 1895 (*W. H. Manning*). ONTARIO: Ottawa, August 4, 1894 (*J. Macoun*).

NOTES ON PELTANDRA, RAFINESQUE.

IVAR TIDESTROM.

(Plate 83.)

During the season of 1904, while searching for aquatic and marsh plants at Cameron Run, near Alexandria, Virginia, I noticed a number of *Peltandrae* in the marsh adjoining the creek. There appeared to be two distinct forms and I naturally supposed the second form to be *P. sagittifolia*, but upon examination the dark green seed disproved my supposition. The difference between the two forms was very marked: the one was robust having ample leaves and a rather large head of fruit, while the other was slender, its leaves narrow-oblong and its head of fruit much smaller. It is true that the leaf-form in many if not in all of our *Araceae*, is very variable, and that even on a single plant we may find leaf-outlines ranging between the maximum and the minimum for that species; yet in the case of our *Peltandrae* there are characters upon which we may possibly recognize two or three long since forgotten forms.

The genus, as diagnosed by Rafinesque (in Journ. de Physique **89**: 103, 1819), included three species (?) known to him, as the following sentence in the above cited publication would indicate: — "Les *Calladium sagittaefolium* et *C. virginicum* se rapportent à ce genre; mais je le base sur une nouvelle espèce *P. undulata.*" In his "*New Flora of North America*" (1836), Rafinesque redefines his genus, giving a number of generic synonyms: he enumerates and describes eight species giving synonyms in all but two instances: he attributes four species to the North and the remaining ones to the South Atlantic States. As our field study has been limited to Maryland and Virginia, we shall only deal with forms collected within the above named States.

Peltandra virginica (L.) Kunth. Rafinesque (l. c.) appears to have been in doubt about the identity of this species for he reverses his opinion about *P. undulata* and brings in *Arum virginicum* L. as a synonym. The history of the latter is very interesting. There is little room for doubt but that Banister knew this species,— so common in all our marshes and along our river banks. Plukenet has the following note under his *Arum minus Sagittariae foliis ex Insula Barbados* [*Xanthosoma sagittaefolium* (L.) Schott] :— "Fortè etiàm Arum aquaticum *Virginianum*"....*Banisteri Cat. Virg. de hujus radice Tockawaugh apud Ogilveium dicta, & aliis Tockahoe, panem conficiunt Indigenae Virginienses, sicut olim Aegypti fecerunt de sua Colocasiae radice.*" (Pluk. Alm. Bot. 51. 1696). The reference to the vernacular name Tockahoe is extremely interesting since this name is still applied to *Peltandra virginica* in Maryland and Virginia. I have heard it applied to our plant in the region along the Patuxent River and between Alexandria and Fredericksburg.

Morison (Plant. Hist. **3**: 545. 1698) notes some characters which indicate that he had the true *Arum virginicum*: — "*Arum aquaticum foliis in acumen desinentibus, fructu viridi, Plantam hanc* Virginiae *alumnam nobiscum communicavit* D. Jo. Banister. *Radix* arundinacea & geniculata, folia è rotunda basi, in acutum mucronem desinentia emittit; fructusque virides. *An vero in rubedinem prae* maturitate transmutentur necne, parum est nobis compertum."

Linnaeus (Hort. Cliff. 435, 1737.) supplements his brief description with this note: — "*Foliorum longitudo semipedis, petiolorum vero pedalis; angulis obtusis a specie* 2da [*Arum maculatum* L.] *differt, foliisque magis oblongis; petioli nigro-purpurascentes sunt, ut & margo foliorum, quod in hac speciale est.*" By examining typical

specimens of *Arum maculatum*, which species Linnaeus uses for comparison, we might suppose that a narrow-leaved form was at hand since the leaves of the latter species are rather narrow and the term *oblongus* as used by Linnaeus and illustrated by him in *Philosophia Botanica* implies an outline (nearly) elliptical in which the relation of the major axis to the minor is nearly three to one. Knowing the intimate fellowship that existed between Gronovius and Linnaeus that the former helped the latter in polishing up the descriptions, while the masterly hand of Linnaeus is clearly seen in the descriptions themselves, we must take account of the description in *Flora Virginica* as forming part of the concept of the species as held by Linnaeus. The descriptions in *Flora Virginica* and *Species Plantarum* appear to embrace a broad-leaved form,— undoubtedly the typical plant of our region.

Richard, the anonymous author of Michaux's Flora (**2**: 187. 1803) makes the following observation with regard to his *Calla virginica* (*Arum virginicum* L.) "Variat foliis angusto-oblongis," which proves that at that time the typical form of the species was held to be a broad-leaved one. This view is supported by Hooker (Exot. Fl. t. 182, 1827) in his description of *Caladium virginicum* (*Arum virginicum* L., *Calla virginica* Michx.). He states also: — "This plant appears to have been known in our gardens for nearly half a century; yet no figure, as far as I know, has yet been published of it." His illustration of the plant (l. c.) is an excellent one.

Peltandra virginica var. **heterophylla** (Raf.) comb. nov. *P. heterophylla* Raf.— To this species of Rafinesque I would refer without hesitation the narrow-leaved form collected by Dr. Greene at Marshall Hall, Md., in 1897, and by the writer in several places throughout our region. Rafinesque's description reads as follows:— "Petiols unequal terete, leaves variable oblong cuspidate, or ovatoblong hardly sagittate or nearly auriculate or base often entire obliqual, lobes unequal rounded short or ovate obtuse." . . . . (Raf. New Fl. N. Am. **1**: 88. 1836). So far as I know this form is always found with the type. The earliest leaves are similar in all the forms: the mature leaves in the type are large, 30 cm. or longer, palmately 3-ribbed, equilaterally triangular, nearly cucullate, i. e. the planes of the lobes form an obtuse and sometimes a right angle with the plane of the upper part of the leaf: in var. *heterophylla*, on the other hand, the mature leaves are barely 20 cm. in length and rarely 6 cm. in width, 1-ribbed, somewhat sagittate,

cordate, or unequally rounded at the base. The same proportions as to size obtain with respect to the spathe, spadix and head of fruit of the two forms. The seed of the two forms germinate in exactly the same manner. The germination has been described by Dr. Th. Holm (Mem. Torr. Bot. Club **2**: 88, 1891.)

Peltandra virginica var. **angustifolia** (Raf.) comb. nov. *P. angustifolia* Raf.—"Leaves hastate cordate narrow oblong, lobes obtuse" .... (Raf. l. c. 89). What has been said in the case of var. *heterophylla* might be repeated of this form. In June, 1906, I observed in Nanjemoy Creek, Md., some plants growing with *P. virginica* which approach nearly the concept of *P. angustifolia.* The leaves are mostly rounded at the base, but occasionally halberd-shaped; the blades are 2.5–3 dm. in length and barely 4 cm. wide. So far as external characters are concerned this form appears to be farther removed from the type than var. *heterophylla.*

Type specimens have been deposited at the Gray Herbarium.

Bureau of Plant Industry,
U. S. Department of Agriculture, Washington, D. C.

Explanation of Plate 83.

Fig. 1. Typical leaf of *Peltandra virginica.*
Figs. 2 & 3. " leaves of *P. virginica* var. *heterophylla.*
Fig. 4. " leaf of *P. virginica* var. *angustifolia.*
(For these drawings thanks are due to Mrs. Agnes Chase.)

THE NORTH AMERCAN VARIATIONS OF LYCOPODIUM CLAVATUM.

M. L. Fernald and C. H. Bissell.

In 1831 Greville & Hooker described from the Canadian Rocky Mountains a 1-spiked variety of *Lycopodium clavatum* as

"Var. *β. monostachyon*; spica solitaria, pedunculis brevibus" from "The Rocky Mountains, north of the Smoking River, in lat. 56°. North America. *Mr. Drummond.*—The variety *β.* is a remarkable one. The whole plant is more compact, the leaves less dentato-ciliate,

and less closely imbricated: the spikes solitary in all the specimens, and supported on a peduncle scarcely more than an inch in length." [1]

Although the variety *monostachyon* was included by Macoun in his Catalogue of Canadian Plants in 1888, it was generally overlooked by American botanists until ten years ago. And though the short peduncles, as described by Greville & Hooker, were not matched by the longer peduncles of a 1-spiked plant much collected during the early part of the present decade in New England and eastern Canada, it was thought advisable to refer the eastern plant, provisionally at least, to var. *monostachyon*, and under this name it has passed in recent publications.[2]

In a discussion of the plant, Dr. R. M. Harper, referring to the original description, said: "This does not exactly describe the New England plant, but as the original specimens came from the Rocky Mountains, in latitude 56°, they were probably dwarfed by the arctic-alpine conditions. . . . A specimen in the herbarium of the New York Botanical Garden, collected by R. S. Williams near Lindeman, Yukon Territory, May 4, 1898, corresponds fairly well with the original description." [3] Other specimens apparently similar to the original are cited by Harper from the Saskatchewan River and Lake Superior.

The large amount of material accumulated since attention was recently called to the 1-spiked plant makes it now possible to estimate more exactly the varietal importance of the short peduncle described by Greville and Hooker. In the 60 or more sheets of the 1-spiked plant examined we find, as already indicated by many who have written of the plants (though not by Greville & Hooker who had but a single collection), that the leaves are generally more ascending and appressed than in ordinary *Lycopodium clavatum*, and those of the ascending branches are slightly if at all dentate-ciliate. In the three sheets which have recently come to hand from the mountains of western Canada — specimens from the Klondyke, Yukon Territory (*MacLean*) and from the Selkirk Mountains of British Columbia (*C. H. Shaw*, nos. 458 and 1078) — the peduncles vary from 0.5–2.5 cm. long and the mature spikes from 1.5–3.5 cm. in length and 3–4 mm. in thickness. Somewhat immature specimens from the south-

[1] Grev. & Hook. in Hook. Bot. Misc. ii. 375, 376 (1831).

[2] M. L. Fernald, Rhodora, iii. 169 (1901); B. L. Robinson, ibid., iii. 237 (1901); R. G. Leavitt, ibid., iv. 57 (1902); R. M. Harper, ibid., iv. 100 (1902).

[3] Harper, l. c.

western corner of the Labrador Peninsula — Seven Islands, Saguenay Co., Quebec (*C. B. Robinson*, no. 839) — are apparently the same; and material from near Cape Horn in the alpine region of Mt. Washington, New Hampshire, though having the spikes slightly longer (2–4 cm. long) and thus approaching the commoner 1-spiked plant of the East, has the peduncles only 0.7–2.5 cm. long. In these plants from the mountains of Yukon and British Columbia, from Saguenay County, Quebec, and the alpine region of Mt. Washington, as well as in those cited by Harper from Yukon, the Saskatchewan, and Lake Superior, we have a series of specimens from subarctic and alpine regions which agree closely with the original description of var. *monostachyon* from "the Rocky Mountains north of the Smoking River, in lat. 56°," with the "peduncle scarcely more than an inch in length." On a sheet of mixed specimens in the Gray Herbarium, showing variations of *L. clavatum* from Ajan (Ayan) on the Ochotsk Sea (*Regel & Tiling*, no. 343),[1] are plants with peduncles 1.5–2.5 cm. long and spikes 3.5–4 cm. in length, thus indicating that var. *monostachyon* occurs also in northeastern Asia. Another specimen on this sheet has elongate slender peduncles but is not satisfactorily referable either to var. *monostachyon* or its commoner representative of eastern America.

The common 1-spiked plant of eastern America, which is familiar to practically every field-botanist of New England and the Maritime Provinces, has very long peduncles and very long spikes. Measurements of the more than 50 specimens studied show the mature spikes of this plant to range from 3.5–11 cm. long, and the peduncles from 4.5–15 cm. long. This plant with long peduncles and spikes does not occur in the arctic-alpine areas, but is abundant throughout the cooler forested country from the North Shore of the St. Lawrence, the Gaspé Peninsula of Quebec, and Cape Breton Island to Vermont, western Massachusetts, and western and southern Connecticut, and it extends locally westward to Michigan. Although occasionally bearing a few peduncles with 2 large spikes,[2] in subalpine situations rarely having peduncles only 2–4 cm. long, and in its appressed leaves and rigid habit approached by exceptional colonies of *L. clavatum* (when the latter grows in exposed or very sunny situations), the plant is ordinarily so strongly marked by its appressed leaves, rigid habit, and long-peduncled large solitary spikes, as to be accepted by all who are

[1] See Regel & Tiling, Fl. Ajan. 127 (1858).
[2] See B. L. Robinson, Rhodora, iii. 237 (1901)

familiar with it in the field as a pronounced variety of *L. clavatum*. That this common 1-spiked plant of our northeastern forested area is not true var. *monostachyon* is obvious; and, since it so rarely shows any marked intergradation to it in the length of peduncles and spikes, we here propose it as

Lycopodium clavatum L., var. **megastachyon**, n. var., foliis apice piliferis, caulinis dentatis vel integris, rameis plerumque adpressis integris vel subintegris; ramulis strictis; pedunculis 4.5–15 cm. longis; spicis solitariis 3.5–9 cm. longis 3.5–5 mm. crassis.

Leaves bristle-tipped, those of the creeping stem dentate or entire, of the strict branches usually appressed and entire: peduncles 4.5–15 cm. long: spikes solitary, 3.5–11 cm. long, 3.5–5 mm. thick.—Widely distributed from Charlevoix and Gaspé Counties, Quebec, and Cape Breton Island to Vermont, western Massachusetts, and western and southern Connecticut; and locally westward to Michigan. Among the many specimens examined, the following are typical. Quebec, vicinity of Cap à L'Aigle, August 11, 1905 (*J. Macoun*, no. 69,273); dry spruce woods, Douglastown, August 22, 1904 (*Collins, Fernald & Pease*): New Brunswick, open spruce woods, Grand Falls, August 14, 1901 (*Fernald* — type specimen in Gray Herb.): Nova Scotia, roadside near "Half-way House," Cape Breton Island, August 17, 1904 (*J. R. Churchill*): Maine, in loam, open spruce woods, Ashland, August 8, 1901 (*Plantae Exsiccatae Grayanae*, no. 59); Sargent Mt., Mt. Desert Island, Sept. 1, 1906 (*E. L. Shaw*); Orono, October 17, 1890 (*Fernald*); woods, Bethel, October 21, 1902 (*W. Deane*); open woods, Bristol, August 23, 1897 (*E. B. Chamberlain*, no. 439): New Hampshire, slopes of Mt. Washington, August 7, 1901 (*E. F. Williams & B. L. Robinson*, no. 810); Sandwich, August 10, 1906 (*F. W. Batchelder*); spruce woods, Alstead, July 31, 1901 (*Fernald*): Massachusetts, Boxford, 1881 (*C. N. S. Horner*); Hoosac Plateau, Otis, September 24, 1904 (*R. Hoffmann*): Connecticut, moist soil, north border of pine woods, Simsbury, August 12, 1904 (*Bissell*); Franklin, August 3, 1906 (*R. A. Woodward*): Michigan, very common in poplar woods, Gwinn, Marquette Co., September 19, 1909 (*A. K. & G. C. Harrison*).

A singular plant collected by Messrs. Arthur K. and Walter H. Harrison on the summits of the Taconic Mountains in Hancock, Massachusetts, and near Lebanon Springs, New York, has the rigid branches and appressed leaves of var. *megastachyon*. Its usually simple whip-like peduncles, however, are 2–4.5 dm. long and bear no true fertile spikes. This plant seems to be a remarkable sterile state of var. *megastachyon*, but it is unwise to base a record for the variety from New York upon such anomalous material.

Lycopodium clavatum, var. *brevispicatum* Peck,[1] known only from a single station on the summit of Wallface Mt. in the Adirondacks, is a very remarkable plant with the short broadish leaves crowded and incurved much as in *L. Selago*, var. *appressum* Desv., the peduncles 3.5–5.5 cm. long, and the mostly solitary short blunt ellipsoid or thick-cylindric spikes 1–2.5 cm. long, 5–7 mm. thick. In these very thick and short blunt spikes it is apparently unlike any other known variety of *L. clavatum*.

While studying the variations of *Lycopodium clavatum* in North America, we have been impressed with the fact, that nearly all the material in the Gray Herbarium from west of the Rocky Mountains differs from the common and essentially typical form of the species in nearly or quite lacking from the leaves of the upright branches the slender soft bristle, which so regularly terminates at least the young leaves of true *L. clavatum*. The typical form of the species, with the soft bristle terminating the leaf, extends westward to the Great Lakes; and there is in the Gray Herbarium a very characteristic specimen of it from the Cascade Mountains, latitude 49, collected by Lyall in 1859. But all the other specimens before us — ranging from the Aleutian Islands to Oregon — have the leaves of the ascending branches entire or subentire and mostly lacking the bristle-tip. This plant is clearly *L. clavatum*, var. "δ. *integerrimum*: foliis omnino (caulinis quoque) integerrimis muticis" of Spring,[2] based upon *L. clavatum* δ of Hooker's Flora Boreali-Americana, which was described as follows: "δ. foliis omnino integerrimis muticis. . . .N. W. America, from Observatory Inlet, *Dr. Scouler*, to Stikine; and on Mount Rainier. *Tolmie*." [3]

The differential characters of the more pronounced variations of *Lycopodium clavatum* in North America, as understood by the writers, may be briefly summarized as follows.

* Peduncles bearing usually 2 or more fruiting spikes.

+ Leaves of the ascending branches bristle-tipped, ordinarily somewhat spreading.

L. CLAVATUM L. Sp. ii. 1101 (1753). Eurasia. Newfoundland to North Carolina, west to Ontario and Michigan; also in the Cascade Mts. (*Lyall*).

+ + Leaves of the ascending branches mostly not bristle-tipped either spreading or ascending.

[1] Peck, 54th Ann. Rep. N. Y. St. Mus. 162 (1901).
[2] Spring, Mon. Lyc. i. 90 (1841).
[3] Hook. Fl. Bor.-Am. ii. 267 (1840).

Var. INTEGERRIMUM Spring, Mon. Lyc. i. 90 (1841). Aleutian Islands to Oregon.

* * Peduncles normally bearing 1 fruiting spike; leaves ordinarily appressed or ascending.

+ Spikes slender-cylindric, at most 5 mm. thick.

++ Peduncles 0.5–2.5 cm. long; spikes 1.5–3.5 (rarely 4) cm. long, 3–4 mm. thick.

Var. MONOSTACHYON Grev. & Hook. in Hook. Bot. Misc. ii. 375 (1831). Saguenay Co., Quebec; alpine region of Mt. Washington, New Hampshire; Lake Superior; Rocky Mountains from Yukon to Alberta and British Columbia; Amur.

++ ++ Peduncles 4.5–15 cm. long; spike 3.5–11 cm. long, 3.5–5 mm. thick.

Var. MEGASTACHYON Fernald & Bissell. Var. *monostachyon* of many recent authors, not Grev. & Hook. Charlevoix and Gaspé Cos., Quebec, and Cape Breton Island to Vermont, western Massachusetts, and western and southern Connecticut; and locally westward to Michigan; passing to the preceding in subalpine situations.

+ + Spikes ellipsoid or thick-cylindric, 1–2.5 cm. long, 5–7 mm. thick; peduncles 3.5–5.5 cm. long.

Var. BREVISPICATUM Peck, 54 Ann. Rep. N. Y. State Mus. 162 (1901). Summit of Wallface Mt., New York.

HYPERICUM AUREUM A CASUAL PLANT IN EASTERN MASSACHUSETTS.— In August 1909 I had a plant brought to me which proved to be *Hypericum aureum* Bartram. It was found by a lady while on a ride from Boston. I later learned from her that it was found below Billerica where she left her automobile to gather some *Thalictrum polygamum* and not near any garden. A few weeks later one plant was found growing near our village in an old lane where the usual confusion of bushes grew. The plant was two feet or more high and the seed pods of 1908 were still on it. Later I observed plants of the same kind in a hedge on private grounds about forty rods away. Birds must have carried the seeds.— EMILY F. FLETCHER, Westford, Massachusetts.

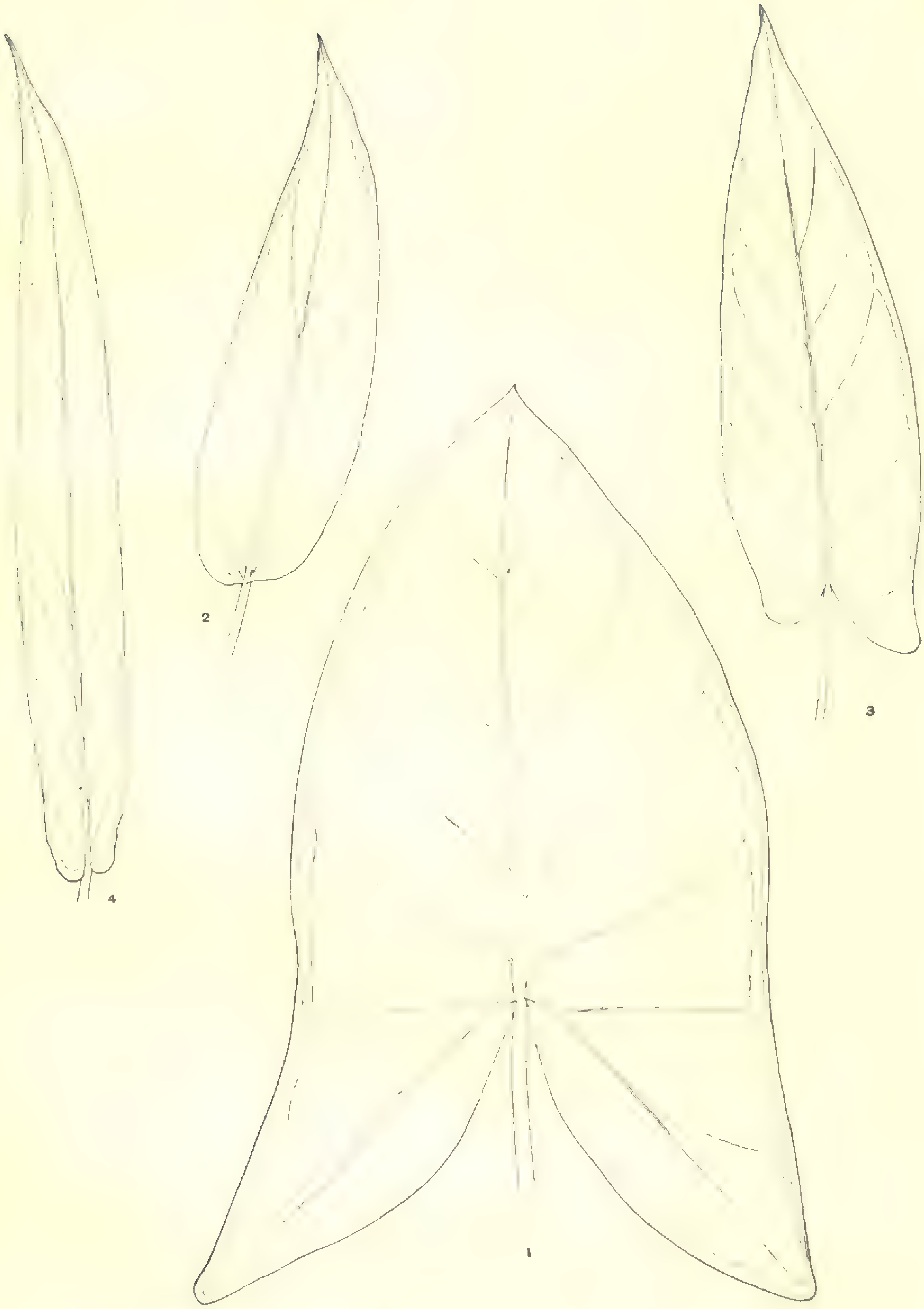
Notes on recent Publications.— A detailed descriptive and copiously illustrated flora of California is an undertaking of such magnitude that even its courageous inception becomes decidedly interesting. Of Professor Jepson's work[1] two fascicles, covering chiefly such arboreal groups as the pines, willows, and oaks, have been issued. Their plan is noteworthy. It is at once evident that the author has felt none of the space-limits which ordinarily tend to compression. The descriptions are unusually full, bibliography is generous, ranges are stated in much detail, and the text enlivened by decidedly popular notes. Thus we learn of *Quercus Sadleriana* that it is "Shade tolerant," that the acorns are eaten by bears, and that it is a "Browse shrub, the foliage greedily favored by mules." Collectors, type localities, altitudinal ranges, and numbered specimens in well known exsiccatae are cited in commendable detail. The introduction of complete keys and a careful attention to contrasting typography give lucidity notwithstanding the amount of matter presented. The illustrations are of two kinds. The line-drawings are of exceptional clearness, especially noteworthy in such structures as cones and acorns. The halftone plates are of decidedly less botanical value. Notable is the serious attempt which the author has evidently made to distinguish plants of unlike taxonomic importance. He is not afraid of the varietal rank and has used it freely. By this means he has strengthened his specific category and is able to show many of the more intimate relationships. Long life to the author! He will need it before he gets through with his task.

Mr. Clute's Laboratory Botany[2] outlines a high school course, which seems to have a great deal in its favor. It is brief, and neither as to subject matter nor required apparatus is it likely to be beyond the powers of the teachers or pupils for which it is designed. Without excluding the use of the microscope and reagents, it is devoted specially to gross morphology. In this matter, and in a wholesome way, it is a trifle reactionary. The author does not shun technical descriptive terms and even introduces a few brief definitions. It is confidently believed that pupils inducted into botany by the aid of this brief course will be able on reaching the college or university not merely to tell something of gametes and plasmolysis but to astonish their professors by an ability to distinguish between a petiole and a peduncle, or possibly even to tell an achene from a seed — B. L. R.

[1] A Flora of California, by Willis Linn Jepson, Assistant Professor of Dendrology in the University of California. Pt. 1, pp. 33–64, pt. 2, pp. 337–368. 8vo. Cunningham, Curtiss & Welch, San Francisco.

[2] Laboratory Botany for the High School, by Willard N. Clute. 8vo. 177 pages. Ginn. & Company.

Vol. 12, no. 134, including pages 17 to 40, was issued 9 February, 1910.



Agnes Chase ad nat. del.

PELTANDIA VIRGINICA AND VARIETIES.

Rhodora

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EUPHORBIA CYPARISSIAS IN FRUIT.

WALTER DEANE.

DURING the thirty years covering my botanical experiences, I have never met with a patch of *Euphorbia Cyparissias*, L., a European species naturalized in North America, without examining it carefully in the hope of finding fruiting specimens exhibiting capsules and ripe seeds. My search was always in vain. The young developing ovary protruded a short distance from the involucre and gave promise of fruition, but that was all. It bent over the edge of the cup and withered away. I was quite used to my repeated failures, as year after year went by, and I became reconciled to leaving forever on my desiderata list the fruit of this species. A joyful surprise, however, was in store for me, and the long waiting was quite worth the keen satisfaction that followed.

It was in the summer of 1909 when I was visiting my friends, Mr. and Mrs. Gilbert N. McMillan on their large estate in Shelburne, New Hampshire, in the valley of the Androscoggin River, a few miles northeast of the White Mountains and between 700 and 800 feet above sea level. On the afternoon of July 1, the day after my arrival, as a party of us were strolling near the house, I observed a patch of *Euphorbia Cyparissias* by the roadside. I stepped up to it, as was my custom, to examine it, and to my delight every plant was loaded with dead-ripe capsules. It was a joy indeed. The situation was on a dry bank of poor soil, some three feet above the level of the road and sparingly covered with grass. For the first time I saw the granular pods and smooth grayish seeds of this species.[1]

[1] In view of the conflicting statements as to the color of the seeds of *Euphorbia Cyparissias*, Gray's Manual, in recent editions, calling them "dark-colored," and

I learned from my host and hostess upon inquiry that the Cypress Spurge was by no means unknown on the farm. This weed was first noticed there some six or seven years ago, occurring in a small patch on either side of the stone wall near one of the main entrances from the road, the spot where I first observed it. Thence it spread over the fields rapidly, though sparsely, and in two or three years had covered, at intervals of varying distances, an area of twenty acres. It was flourishing under the most varied conditions, as I found on examination the next day, but was always heavily laden with fruit. In one piece of very barren, rocky soil it was perfectly at home, while the largest, thriftiest, and most recent colony that I found was in a part of the hay field that had been cut the year before, in 1908, and later in the summer plowed and fertilized, thus offering what I have always considered uncongenial conditions for the growth of this plant. Some weeks later Mrs. McMillan noticed a few specimens of the Euphorbia springing up here and there over this area, and they spread with great rapidity. This I realized on visiting the spot and I was astonished to see how the species had invaded a new territory and obtained so strong a footing in so short a time. The plants were large and vigorous and were loaded with ripe capsules to an extraordinary degree. On a single specimen, consisting of four stalks, there were, by careful count, eighty-eight capsules. That means two hundred and sixty-four seeds. The plants were growing very closely together and they covered an area of several square rods, while a net-work of root-stocks, a short distance below the surface of the ground, showed what a firm hold this species can secure when once it has found congenial conditions. This vigorous system of root-stocks is of course sufficient to maintain the

Hooker's Student's Flora of the British Islands characterizing them as "smooth globose pale * * * almost white," a search through the library of the Gray Herbarium has been made to ascertain what the various writers have said on this subject. The most satisfactory account and one which agrees very closely with the color of the Shelburne seeds is in Syme's English Botany, viii. 108 (1873) as follows, "Seeds quadrate-subglobular, smooth, dim, ashy-grey, with a rather large suborbicular caruncle." In view of the very meagre statements that appear to exist on this question, seeds were submitted to an expert in color, Mr. F. Schuyler Mathews. He describes the color as follows, "The seed color is light bluish gray, to deeper violet gray, with slight surface iridescence under magnification in a good light; caruncle large, golden ochre." The difference in the color of the individual seeds appears to be due to the varying degree to which the outer light gray somewhat friable coat of the seed is rubbed off, the inner layers being of deeper hue. The seeds, including the caruncle, are from 2.25 to 2.5 mm. in length. The capsule is depressed globose with three rounded lobes. It is 3 mm. long and slightly more in diameter. The surface is green, minutely roughened with whitish warts.

species for a long time without the need of fruit, and it is but one example in many to the same effect.

After this experience I naturally wanted to know how other botanists had fared in this regard, and first I examined the large collection of specimens in the herbarium of the New England Botanical Club without finding a single fruit. In the Gray Herbarium, however, I found two developed capsules, one on a plant collected by the roadside in Almanarre, Department of Var, France, on April 17, 1905, by F. Raine, and the other on a plant collected at Deidesheim, Bavarian Palatinate, Germany, no date, by Schultz Bipontinus. The latter specimen is from the herbarium of George Thurber. I then wrote to over thirty botanists having herbaria and I received replies from all but two or three. In but two instances did I receive records of fruit.

Mr. W. W. Eggleston wrote me that in the Columbia University Herbarium, now at the New York Botanical Garden, there are three fruiting specimens, one from this country and two from Europe. The first one, which is mislabelled *Euphorbia Esula* L., was collected at Arrochar, Staten Island, N. Y., June 8, 1895, by W. C. Kerr. On this plant are more than twenty pods. Most of them "appear plump and are well filled." Another specimen which is from the Meisner Herbarium, was collected at Bern, Switzerland, in 1827. The collector's name is not given. "This specimen has no pods on the plant, but there are more than twenty-five seeds in a pocket. . . . Many of the seeds. . . . are plainly ripe." The third specimen was collected near Nyborg, Fyen, Denmark, June 15, 1901, by K. Wiinstedt. "This has at least seven pods." Most of them "appear plump and are well filled." Judge J. R. Churchill has a specimen that he collected at Blumenthal, Mürren, Switzerland, on August 31, 1907. It "has at least 12 well developed fruits on its 16 peduncles. Some of the capsules are ripe and dehiscent, showing within the plump, large, seeds." As the collector was not looking for a fruiting specimen, it is fair to infer that there was more fruit in the vicinity.

The above records of fruit from but five stations in Europe and but two in this country, Shelburne, N. H., and Staten Island, N. Y., in so many herbaria examined, shows pretty conclusively that the plant has in a great measure lost its power of setting fruit, at least in America. It doubtless does fruit more or less freely in its native European home, but it is strange that so few fruiting specimens should exist in our large herbaria on this side of the water, the species being such a common one,

and the fruit such a diagnostic character. The records at least show where fruiting specimens are to be found.

I will quote from a few replies received, to show how diligently and yet unsuccessfully the fruit has been sought for by keen-eyed botanists. Mr. C. H. Bissell of Southington, Conn., says, "Have looked for years for fruit of *Euphorbia Cyparissias*, but have never found any. Cannot say that it never fruits, but it certainly does not do so usually." Dr. E. H. Eames of Bridgeport, Conn., writes, "I have never seen any fruit of *Euphorbia Cyparissias*, although constantly on the lookout for it. It seems to be one of those instances where fruit is of little consequence for propagation, the root-system sufficing." Miss Anna Shepard writes from Burlington, Vt., "We have no specimens of *Euphorbia Cyparissias* with ripe seeds either in the University Herbarium or in the Pringle Herbarium. Dr. Pringle says he has never seen it in fruit, and he finds that his European specimens have no seeds." Dr. J. N. Rose writes from the National Museum, Washington, D. C., "We have about 25 specimens of *Euphorbia cyparissias* L., but none of them are in fruit." Prof. C. F. Millspaugh of the Field Museum of Natural History, Chicago, Ill., says, "Of the 50 or more sheets in my private Euphorbia herbarium and the sheets in the herbarium of this Museum there is none upon which the capsules are at all developed. These sheets are both from America and from Europe.... I have searched upon hands and knees through many patches of this species in various parts of this country in the hope of finding a capsule, having needed the same for a number of years in my work on the genus. I have, however, never seen a developed capsule on the plants in the United States. The plant appears, without doubt, to distribute itself entirely through the root system (in regard to its life in America). How frequent capsular development may be in Europe I am unable at this time to state." Mr. J. M. Macoun of the Geological Survey of Canada writes from Ottawa as follows, "I have looked over all our specimens of *Euphorbia Cyparissias*, both from Canada and the United States and find no specimens with ripe seeds, although we have quite a number collected late in the summer."

These replies are quite significant and they indicate very clearly, to my mind, that fruit is lacking in almost all our herbaria not because the collectors have not happened to look for it in most cases, and were content with flowering specimens only, but because fruit is very scarce, in this country primarily, and doubtless to a certain degree in

Europe. Its great scarcity makes me wonder more and more at my Shelburne experience. What was the peculiar local influence which caused fertility at this station and time? Was it a matter of soil-conditions, weather, insect visitors, or the purely casual reappearance of an ancestral trait? To these questions there is no answer as yet apparent. I shall be interested to learn whether the plants fruit again as abundantly, if at all, this coming season. I sincerely hope that the search of those enthusiasts above mentioned will be rewarded as mine was.

Cambridge, Massachusetts.

AGROPYRON CANINUM AND ITS NORTH AMERICAN ALLIES.[1]

Arthur Stanley Pease and Albert Hanford Moore.

The genus Agropyron is, as is well known, a very puzzling one. Two recent revisions [2] have, in the opinion of the writers, not entirely cleared up the difficulties presented by the relatives of *Agropyron caninum* (L.) Beauv. The difficulty of indicating the rank and relationship of the members of the group by a series of independent species, as has generally been attempted, arises from an extraordinary amount of intergradation. *Agropyron caninum* passes, by the loss of its awns, to *A. tenerum* Vasey; the latter to *A. violaceum* (Hornem.) Lange, by the shortening and often thickening of the spikes; this again, on the one hand to *A. violaceum* (Hornem.) Lange var. *latiglume* Scribn. & Sm., by the flattening out of the keel and the presence of pubescence on the spikelets, or to *A. violaceum* (Hornem.) Lange var. *andinum* Scribn. & Sm., by the presence of awns. Forms in which the awns are strongly bent outward have been described as *Triticum caninum* L. var. *Gmelini* Ledeb., which may also be regarded as *Triticum*

[1] The authors desire to express their thanks to the staff of the Gray Herbarium for the privileges and valuable suggestions received from them.

[2] F. Lamson Scribner and J. G. Smith, Native and Introduced Species of the Genera Hordeum and Agropyron. Studies of American Grasses, U. S. Dept. Agr. Div. Agrost. Bull. no. 4, 25–23 (Feb. 6, 1897); C. V. Piper, Agropyron tenerum and its Allies, Bull. Torr. Bot. Club, xxxii, 542–547 (Oct. 21, 1905).

or *Agropyron caninum* with long, recurved awns, as, indeed, Ledebour considers it. Again, by a lengthening out of the awns, there is an imperceptible transition from *A. caninum* to *A. Richardsoni* (Trin.) Schrad., as defined by Scribner and Smith.[1] It is also possible to view *A. violaceum* (Hornem.) Lange, together with its varieties *latiglume* and *andinum*, as short-spiked representatives of *A. caninum*. Another noteworthy feature of the group is a striking parallelism, in that almost every variety has a smooth and a hairy development.

The Agropyra in question belong to the non-stoloniferous group. While this distinction, based on the presence or absence of stolons, may seem an artificial one, it is so generally considered important in the Gramineae and Cyperaceae that we cannot with Ascherson and Graebner subordinate *A. violaceum* to *Triticum repens*,[2] nor can we follow Beal,[3] who describes *A. repens* (L.) Beauv. var. *tenerum* (Vasey) Beal.[4]

The earliest specific name in the group is *A. caninum* (L.) Beauv., which goes back to the name *Triticum caninum* L., of the first edition of the Species Plantarum. Linnaeus here discusses two species, *T. repens* and *T. caninum*. Of the former he says, "radice repente," of the latter, "calycibus subulatis quadrifloris aristatis." The authors of the synonyms of *T. caninum* cited by him all indicate plants with aristae. The first synonym given is *Gramen caninum non repens elatius spica aristata* Moris.[5] The two remaining synonyms contain the word, "repens," and the accompanying descriptions state that the plants are stoloniferous; the species is therefore a mixture, as so many of the Linnaean species are. The first mentioned synonym and the type-description are clear, and must hence be taken as conclusive. Morison says that the stem of his plant is glabrous, but is not explicit as to the leaves. Buxbaum repeats the description given by Morison. Both give figures — Buxbaum's being especially good — each of which plainly represents a glabrous species with aristae of medium length, such as *A. caninum* has been held to be. Linnaeus was not satisfied with his first treatment, so that in the Flora Suecica[6]

[1] U. S. Dept. Agr. Div. Agrost. Bull. no. 4, 29 (Feb. 6, 1897).

[2] *T. repens* L. *B. T. biflorum* (Brign.) A. & G. A. *virescens* (Lange) A. & G. Syn. Mitteleurop. Flora, ii, 1, 654 (Dec. 10, 1901).

[3] Grasses N. A. ii, 637 (1896).

[4] It is perhaps worthy of note that many of the variations described below, based upon length of spikes and of awns and presence of pubescence and glaucousness, are paralleled, in greater or less degree, by variations in *A. repens* (L.) Beauv

[5] Pl. Hist. Univ. Oxon. iii, 177, t. 1, fig. 2, sect. 8 (1715); Buxb. Pl. minus cogn. circ. Byzant. Orient. Observ. cent. iv, 29, t. 50 (1733).

[6] Ed. II, 39 (1755).

he calls the plant *Elymus caninus*, a name taken up by a number of subsequent authors. Under these three names, *Triticum caninum*, *Elymus caninus*, and *Agropyron caninum*, our plant is discussed in a multitude of European and American works. Nowhere does there seem to be the slightest difference of opinion as to its nature. The name *Triticum sepium* Lam.[1] seems to be a synonym of *Agropyron caninum*, and has generally been so regarded. The name *Festuca nutans* Moench? also seems to be properly included here. Moench[2] himself says of his plant, "An *Elymus caninus* Linnaei."

Very closely related to *A. caninum* (L.) Beauv. is *A. tenerum* Vasey. It differs from it in no important character, except the absence of awns, and this is not constant, for specimens are not rare which it is difficult to place. Some attempt has been made to distinguish eastern plants from it on the one hand, and from *A. violaceum* (Hornem.) Lange on the other. Scribner[3] unites them as a species under the name of *A. Novae-Angliae*. An extremely painstaking examination of the subject has led us to agree with Hitchcock[4] that this species cannot be clearly separated from the *A. tenerum* of the West. It may be interesting to compare what Scribner says: "In regard to the Agropyron for which I have proposed the name *Novae-Angliae*, I must think it quite distinct from the *A. tenerum* of the west, although it suggests that species somewhat in habit. It looks more like a caespitose form of *A. repens.* I believe it has been included under *A. violaceum* by some authors, but it certainly is distinct from that species, as represented in our herbarium, from northern Europe and from the Rocky Mountain region."[5] "The plant described in Gray's Manual, ed. 6, 672, is the western form which is doubtless true Agropyron violaceum, Lange, while the variety mentioned 'with longer usually pale narrow spikes and attenuate often long-awned glumes,' is the plant here described as *Agropyron Novae-Angliae*."[6] Thus it is seen that Scribner himself calls attention to the affinity of the eastern plant. Through it, *A. tenerum* Vasey passes readily to *A. violaceum* (Hornem.) Lange.

Scribner and Smith[7] have described *Agropyron violaceum* (Hornem.)

[1] Flore Franç. iii, 629 (1778); Encycl. Meth. (Bot.) ii, 563 (1786).
[2] Meth. Pl. Hort. Bot. Agr. Marburg, 191 (1794).
[3] In Brainerd, Jones, and Eggleston, Fl. Ver. 103 (1900).
[4] Gray, Man. ed. VII, 167 (1908).
[5] In Brainerd, Jones, and Eggleston, Flora Vt. 9 (1900).
[6] L. c. 103.
[7] U. S. Dept. Agr. Div. Agrost. Bull. no. 4, 30 (Feb. 6, 1897).

Lange var. *latiglume*, the salient feature of which is wider glumes covered with a fine pubescence. In other members of our group the glumes are merely minutely ciliate on the margins. In most of the group it is difficult to measure the glumes, because of their shape, for they are folded strongly so as to have a prominent keel. In *A. violaceum* var. *latiglume* the keel is much flattened or almost wanting; that is, the glumes are, as it were, unfolded, thus giving the appearance of width. This fact is certainly more striking than any actually greater breadth, even if that exists. The variety was described from the West, but all of the Arctic material in the Gray Herbarium, except one violet-spiked specimen of *A. violaceum*, answers to the description of it. This suggests the bare possibility that *A. violaceum* (Hornem.) Lange var. *virescens* Lange may belong here.

The intimate relationship between *A. violaceum* (Hornem.) Lange and *A. caninum* (L.) Beauv., referred to above, is brought out by Beal,[1] who says, "Perhaps this [*A. violaceum*] is a northern or alpine form of *A. caninum* R. & S., from which it differs in having a culm 30–50 cm. high, leaves 3–4 in number,[2] blades proportionately shorter, spikes 3–8–12 cm. long, narrow, strict, more or less tinged with violet. Spikelets 3–5 flowered; floral glume wider than in *A. caninum*, not so firm, nerves more prominent; awn short or none; palea shorter than the floral glume, pectinate-ciliate." Even these differences do not all hold. A violet tinge is occasionally found in *A. caninum*, while entire absence of violet color is common in *A. violaceum*; the palea- and glume-characters are not good. *Triticum violaceum* Hornem.[3] is the first published name, but the first varietal appellation, which we believe expresses the rank best suited to this plant, is *Triticum biflorum* Brign. *β Hornemanni* Koch.[4]

Plants with greener, more stocky spikes have been distinguished as *Agropyrum violaceum* (Hornem.) Lange *β. virescens* Lange.[5] This tendency is the common one in the White Mountains, while the other is known from the Arctic Region and the West. However, the White Mountain development is not unknown in the West, where one also finds the slender-spiked, narrow-leaved plant of Greenland, probably

[1] Grasses N. A. ii, 639 (1896).

[2] This character we find to be inconstant.

[3] Flora Dan. xii, t. 2044 (1834).

[4] Syn. Flor. Germ. Helv. ed. II, ii, 953 (1844). Koch bases his variety directly upon *Triticum violaceum* Hornem.

[5] Consp. Flor. Groenl. 155 (1880).

representing the type,[1] together with a thick-spiked plant having a strong violet color. Every variation in leaves from revolute to flat and broadish is to be noted. Not one of the members of the group under discussion fails to show an indefinite violet tinge at times. The color shades off into the colorless or green condition too imperceptibly to give rise even to color forms. The tendency is a very common one throughout the Grasses, so that it does not seem noteworthy.

Following Piper, l. c., Hitchcock, in the seventh edition of Gray's Manual,[2] uses for *Agropyron violaceum* (Hornem.) Lange the name *A. biflorum* (Brign.) R. & S. The original publication of *Triticum biflorum* by Brignoli was not accessible to us; but fortunately it is copied by Roemer and Schultes.[3] The conspicuous point in the original description, reiterated by them, is that the glumes are 3-nerved. The glumes of our American plants are 5–7-nerved. This distinction has been held by monographers of the genus to be important, yet, although Hitchcock credits our plant with having 5–7 nerves he calls it *A. biflorum*. Another, not insignificant objection to accepting the name is the peculiar range. Roemer and Schultes note it from, "Monte Matajur,[4]" and while later European authors extend this range a little, all that we have found agree that it is a quite local plant.[5] European authors, who should be more familiar with *A. biflorum* than the meagre representation of rare European plants in American herbaria permits us to be, do not generally hold the view that *A. biflorum* and *A. violaceum* are identical, but only closely related. Ascherson and Graebner, for example, treat the latter as two varieties of a subspecies, *biflorum*, of *Triticum repens* L., A. *virescens* and B. *Hornemanni*. Nyman[6] believes that *Triticum biflorum* is distinct, and says, "gramen rarius." Ascherson and Graebner are of the opinion that Nyman's plant is *virescens*. The following quotation from their Synopsis is indicative of the uncertainty which surrounds the name *T. biflorum*: "Eine sehr kritische Pflanze, die trotz ihrer fast stehts sehr eigenartige Tracht kaum durch scharfe Merkmale von T. eu-repens getrennt ist." These authors also note the three nerves, "Hüllspelzen lanzettlich (wenigstens

[1] At least, there is a specimen of this phase in the Gray Herbarium which was collected in Greenland by *J. Vahl*, the collector of the type. It may well be the material of the type collection itself.

[2] Ed. VII, 166 (1908).

[3] L.— R. & S. Syst. Veg. ii, 756 (1817).

[4] Near Görz.

[5] The reference of it to Syria by the Index Kewensis is probably a mistake.

[6] Consp. Flor. Europ. 841–842.

die untere) 3-nervig." In view of all this, it does not appear justifiable to consider the name *T. biflorum* synonymous, by the Vienna Rules, with *A. violaceum*. Furthermore it is not necessary to do so, because, for us, the first name which can be taken up in the varietal rank, is, as we have shown, *Triticum biflorum* Brign. *β. Hornemanni* Koch. Transitional material to *Agropyron tenerum* Vasey is especially common from the Gaspé Peninsula. In fact, if this region alone were taken into account, one would be inclined not to make any distinction at all.

A co-type of *A. brevifolium* Scribn.[1] needs a word of comment. It differs from the ordinary forms of *A. violaceum* only in having many sterile shoots; the length of the leaves is unimportant. The larger number of shoots hardly constitutes a character, so that the name *A. brevifolium* may well be relegated to synonymy.

The next variety which needs to be discussed is the one described in correct form under the genus Triticum as *T. caninum* L. var. *Gmelini* Ledeb.[2] Oddly enough, the correct combination has been actually used, though not technically made, for in the Bulletin of the Torrey Botanical Club,[3] Vasey speaks of *Agropyrum caninum* (L.) Beauv. var. *Gmelini* Ledeb., a combination not made by Ledebour, and so far as we are aware, not formally published by anyone. According to the Vienna Code, a combination is not considered made unless reference is given to a previously published name, which in this case was not done.

The three last mentioned plants may best be treated as parallel varieties. There exists a pubescent form of *Triticum caninum* var. *Gmelini*. The type of *Agropyron Gmelini* (Ledeb.) Scribn. & Sm. var. *Pringlei* Scribn. & Sm. in the Gray Herbarium, as well as most of the specimens so labelled, is evidently this form. No other constant difference from *A. Gmelini* has been detected. A specimen in the Gray Herbarium labelled *A. Scribneri* Vasey, which also does not differ essentially from our plant, is noted, on the sheet, by the word, "Type." In fact, the affinity is recognized by Vasey, who says of it, "It is perhaps the *A. caninum*, var. *Gmelini*, Ld." As there may be some doubt about the identity of *A. Scribneri*, since the specimen labelled

[1] U. S. Dept. Agr. Div. Agrost. Bull. no. 11, 55 (July 20, 1898).

[2] Flora Alt. i, 118 (1829); figured, Ic. Pl. Nov. imperf. cogn. Flor. Ross. iii, 16, t. 248 (1831).

[3] x, 128 (Dec. 1883).

'type' is not technically such, Vasey not having cited any type, it seems wisest to derive the name of the form from *A. Gmelini* var. *Pringlei*, the identity of which cannot be questioned.

The last plant to be considered is that called by Scribner and Smith *Agropyron Richardsoni* (Trin.) Schrad. The evidence for identifying this name with the plant in question is extremely weak. The original description of *Triticum Richardsoni* Schrad.[1] reads as follows: "Agropyr. Richardsonii Ind. sem. H. Berol. 1832.— America borealis arctica ? ♃ — A Trit. repente vulgari differt foliis firmioribus serius involutis spica graciliori; spiculis minus distichis paucifloris, floribus longius; aristatis." It is true that the use of the expression, "Trit. repente," may not be accurate, but is there any reason for assuming this? Surely, "longius aristatis," is a mild statement for the longest awns in our group. Besides the published evidence, there is some supposed further documentary evidence. Scribner and Smith [2] say, "*Triticum richardsoni* Trin.[3] in Reliq. Scrad. [sic.], Linn., **12:** 467 (1838), according to a specimen from the St. Petersburg Academy in the Gray Herbarium." The only specimen of this species from St. Petersburg in the Gray Herbarium is labeled: "**Ex herbario horti Petropolitani**, 'Triticum Richardsoni' = T. violaceum, Hornem." The expression, "= T. violaceum, Hornem.," is added in the handwriting of Dr. Gray, and the quotation marks seem to be in an ink of the same date, leaving "Triticum Richardsoni," carelessly written in an unknown hand, as the only original label. Under "*A. richardsoni*,"[4] Scribner and Smith cite as seen in the Gray Herbarium: "British Columbia: Richardson, type collection." A careful search has revealed no such specimen. Probably "Gray Herbarium" is an error.

There is, however, a good name for the plant under discussion, namely, *Agropyrum caninum* (L.) Beauv. var. *unilaterale* (Cassidy) Vasey;[5] *A. unilaterale* Cassidy.[6] Cassidy's description follows: "Flowering glume finely scabrous, flattened and obscurely nerved below; apex rougher, acutely two-toothed, the mid-nerve terminating in a rough, straight awn 2 inches long.[7] Banks of streams 7,000 to

[1] Linnaea, xii, 467 (1838).

[2] U. S. Dept. Agr. Div. Agrost. Bull. no. 4, 29 (Feb. 6, 1897).

[3] There is no evidence that Trinius is the authority.

[4] The original authority for *A. Richardsoni* is Hort. Berol. It appeared as a nomen nudum in the Ind. Sem. Hort. Bot. Berol. 1831 Collect (1832), a copy of which A. H. Moore was permitted to see at the Berlin Botanical Museum.

[5] Contr. U. S. Nat. Herb. i, 279 (Oct. 31, 1893).

[6] Colo. State Agr. Coll. Exper. Sta. Bull. no. 12, 63 (July, 1890).

[7] We wish to call attention especially to his measurement of the awns, which is even rather extreme.

8,000 ft. [Colo.]." This description leaves little doubt as to the meaning of the name, and, indeed, Scribner and Smith consider it a synonym of *A. Richardsoni*. As the first varietal name Vasey's combination is the correct one. The following quotations will throw some light on the nature of *A. caninum* (L.) Beauv. var. *unilaterale* (Cassidy) Vasey, and also upon its relationship. Ramaley[1] says: "From this description [Vasey's] and from an examination of specimens distributed by the Department of Agriculture it appears that this plant is very near to A. violaceum (Hornem.) Lange, forma *caninoides*[2] described below; it is probable that through these formae[3] the two species[4] are related." Ramaley, having apparently read only Vasey's brief description,[5] assumes that *A. caninum* var. *unilaterale* differs only very slightly from the type.

Scribner and Smith, under *A. caninum* (L.) Beauv., write: "Forms of this, with unilateral spikes, have been referred to *A. richardsoni*, which has awns three or four times as long as those of *caninum*, and the flowering glume bidentate below the origin of the awn. Slender forms have been referred by collectors to *A. tenerum* Vasey, and forms with short compact spikes and short awns to *A. violaceum* Vasey."

Scribner and Smith[6] describe *Agropyron tenerum* Vasey var. *longifolium*. We have seen no specimens of this, and are therefore unfortunately unable to discuss it.

We may now proceed to the taxonomic treatment and diagnoses. We desire to call attention to the fact that the measurements in all cases represent the usual or average limits, and that measurements may be observed which lie above or below them. For example, if the awns are said to be 1–3 cm. long, some awns may be found 0.8 or 4 cm. long, but this would not apply to more than a small proportion of the awns in the given spike. Approximate averages are given whenever possible, to show the proportional size of the spikes, which is an important character.

[1] Geol. Nat. Hist. Surv. Minn.— Minn. Bot. Studies, Bull. no. 9, 3, 107 (June 9, 1894).

[2] We believe this form to be inseparable from *A. caninum*. It does not seem best to retain names for intermediate forms of this sort, where no sharp line exists, for there is no more reason for using one name than several.

[3] *A. violaceum* (Hornem.) Lange f. *caninoides* Ramaley and *A. violaceum* (Hornem.) Lange f. *violacescens* Ramaley. The latter is Ramaley's name for *A. caninum* var. *unilaterale*.

[4] Ramaley means here *A. caninum* and *A. violaceum*.

[5] Vasey does not mention the awns.

[6] U. S. Dept. Agr. Div. Agrost. Bull. no. 4, 30 (Feb. 6, 1897).

KEY TO THE VARIETIES AND FORMS.[1]

a. Awns mostly under 1.5 cm. long, or none. b.
  b. Awns mostly 7–15 mm. long. c.
    c. Plants glabrous . . . . 1. *A. caninum*
    c. Some or all of the leaves or sheaths hairy. d.
      d. Plants not glaucous . . . . . 2. *A. caninum* f. *pubescens*
      d. Plants glaucous . . . . 3. *A. caninum* f. *glaucum*
  b. Awns none, or not exceeding 6 mm. e.
    e. Spikes generally long and slender (average length about 12–14 cm.): usually lowland plants. f.
      f. Plants glabrous . . . . 4. *A. caninum* var. *tenerum*.
      f. Leaves, sheaths, or both provided with hairs. g.
        g. Plants not glaucous . 5. *A. caninum* var. *tenerum* f. *ciliatum*.
        g. Leaves and sheaths glaucous.
          6. *A. caninum* var. *tenerum* f. *Fernaldii*
    e. Spikes generally short and thick (average length about 7–8 cm.): usually alpine or far northern. h.
      h. Glumes with a fine pubescence. 7. *A. caninum* var. *latiglume*.
      h. Glumes minutely ciliate on the margins, not pubescent. i.
        i. Leaves glabrous . . . . 8. *A. caninum* var. *Hornemanni*.
        i. Leaves pilose above.
          9. *A. caninum* var. *Hornemanni* f. *pilosifolium*.
a. Awns mostly 1.5 cm. long or over. j.
  j. Spikes short and thick, average length (exclusive of terminal awns) 5–7 cm. k.
    k. Awns ascending, not strongly recurved.
      10. *A. caninum* var. *andinum*.
    k. Awns strongly recurved (often bent out nearly at right angles). l.
      l. Plants glabrous . . . . 11. *A. caninum* var. *Gmelini*.
      l. Leaves (rarely sheaths also) provided with hairs.
        12. *A. caninum* var. *Gmelini* f. *Pringlei*.
  j. Spikes (inclusive of awns[2]) 7.2–20 cm. long. m.
    m. Plants glabrous . . . . 13. *A. caninum* var. *unilaterale*.
    m. Sheaths and often leaves provided with hairs.
      14. *A. caninum* var. *unilaterale* f. *ciliatum*.

1. Agropyron caninum (L.) Beauv. Spikes long and slender, 7.2–21.6 cm. long (exclusive of the terminal awns), 3–10 mm. wide (exclusive of the awns); awns 5–25 mm. (mostly 7–15 mm.) long,[3] generally spreading, not rarely ascending (seldom giving the spike a unilateral appearance).— Agrost. 102, 146 (1812); L.— R. & S. Syst. Veg. ii, 756 (1817); Reichenb. Ic. Flor. Germ. Helv. i, 29, t. 19, fig. 1381 (1850);[4] Scribn. & Sm. U. S. Dept. Agr. Div. Agrost. Bull. no. 4, 29 (Feb. 6, 1897).

Gramen caninum non repens elatius spica aristata Moris. Pl. Hist.

[1] Any key to this group would fit only the more typical cases, because of the intergradation.

[2] The awns are included because their ascending or approximate character makes them an integral part of the spike.

[3] If the low measurements (5–6 mm.) hold throughout a spike, the specimen will be better treated as no. 4.

[4] Color of the awns purplish.

Univ. Oxon. iii, 177, t. 1, fig. 2, sect. 8 (1715); Buxb. Pl. minus cogn. circ. Byzant. Orient. Observ. cent. iv, 29, t. 50 (1733).

Triticum caninum L. Sp. Pl. ed. I, 86 (1753); Zinn, Cat. Pl. Hort. Acad. Agr. Gott. 67 (1757); Sm. Flora Brit. i, 159 (1800); Host, Ic. Descript. Gram. Austr. ii, 20, t. 25 (1802); Engl. Bot. t. 1372 (1805); Flora Dan. ix, 1, t. 1447 (1818); Sm. Engl. Flora, i, 184 (1828), etc.

Elymus caninus L. Flora Suec. ed. II, 39 (1755), Syst. Nat. ii, 879 (1760), Sp. Pl. ed. II, i, 124 (1762); L.— Willd. Sp. Pl. i, 469 (1798); Schkuhr, Bot. Handb. i, 56 (1791), etc.

Triticum radice fibrosa, foliis hirsutis, locustis quinquefloris, aristatis Haller,[1] Hist. Stirp. Indigen. Helv. 212 (1768).

T. sepium Lam. Flore Franç. iii, 629 (1778), Encycl. Meth. (Bot.) ii, 563 (1786); Lam. & DC. Flore Franç. iii, 83 (1805).

Festuca nutans Moench? Meth. Pl. Hort. Bot. Agr. Marburg, 191 (1794).

Braconotia elymoides Godr. Flore Lorr. ed. I, iii, 193 (1844).

Braconnotia elymoides Godr. Flore Lorr. ed. II, ii, 454 (1857).

Agropyron violaceum (Hornem.) Lange f. *caninoides* Ramaley, Geol. Nat. Hist. Surv. Minn.— Minn. Bot. Studies, Bull. no. 9, 3, 108 (June 9, 1894).

A. caninoides (Ramaley [2]) Beal, Grasses N. A. ii, 640 (1896).

Triticum caninum L. var. *typicum* A. & G. Syn. Mitteleurop. Flora, ii, 1, 642 (Dec. 10, 1901); Schinz & Keller, Flora der Schweiz, ed. II, ii, 30 (1905).

Agriopyrum caninum (L.) Schinz & Keller, Flora der Schweiz, ed. II, ii, 30 (1905), attributed to Beauv.

Specimens examined: Labrador? (*Prof. Brunet*): Quebec, Between Baldé and the Baie des Chaleurs, Bonaventure River, Bonaventure Co., August 5, 6, & 8, 1904 (*J. F. Collins, M. L. Fernald*, and *A. S. Pease*); River Ste. Anne des Monts, Gaspé Co., August 16, 1906 (*M. L. Fernald* and *J. F. Collins*, nos. 170 and 170a); Shore of Boundary Lake, Kamouraska Co., July 31, 1878 (*C. G. Pringle*); Vicinity of Cap à l'Aigle, August 19, 1905 (*J. Macoun*, Herb. Geol. Surv. Can. no. 68982): New Brunswick, (*J. Fowler*): Maine, Fort Fairfield, July 5, 1893 (*M. L. Fernald*, no. 196); Along St. John River, St. Francis, 1881 (*K. Furbish*, no. 13); Houlton, Aug. 26, 1897 (*M. L. Fernald*); Hartford, July 18, 1901 (*J. C. Parlin*, no. 1427): Vermont, North Pownal, August 1, 1898 (*J. R. Churchill*): Massachusetts, Concord, July 6, 1888 (*C. W. Swan* and *C. W. Jenks*): Connecticut, Somers, July 20, 1904 (*C. H. Bissell*): Pennsylvania, Pocono Mountain, August 2, 1860 (*T. C. Porter*): Michigan, Jackson, July 11, 1838 (*Houghton*): Wisconsin, Beloit, 1860 (*T. J. Hale*): Minnesota,

[1] A Postlinnaean name of Prelinnaean form.

[2] Erroneously cited by Beal, as R. Pound, from the title page of a preceding article on the Mucoraceae.

Thompson, Carlton Co., July 6, 1891 (*J. H. Sandberg*, no. 1407): NEBRASKA, Lake region of Grant Co., 3½ miles N. E. of Whitmer, July 29, 1893 (*P. A. Rydberg*, no. 1617); MONTANA, East Gallatin Swamps, July 24, 1896 (*P. A. Rydberg*, no. 3191): WYOMING, Fort Bridger, August 5, 1873 (*T. C. Porter*): WASHINGTON, Loomis, June 18, 1902 (*T. C. Porter, D. Griffiths*, and *J. S. Cotton*, no. 340): NEVADA, King's Cañon, Ormsby Co. (*C. F. Baker*, no. 1286): CALIFORNIA, Jess Valley to Blue Lake, northeastern Cal. (*D. Griffiths* and *B. Hunter*, no. 444): ATHABASKA, Dunvegan, Peace River, July 28, 1903 (*J. M. Macoun*, Herb. Geol. Surv. Can. no. 59546): BRITISH COLUMBIA, Vicinity of Comox, Vancouver Is., July 5, 1893 (*J. Macoun*, Herb. Geol. Surv. Can. no. 50).

2. A. CANINUM (L.) Beauv. f. **pubescens** (Scribn. & Sm.) Pease & Moore, comb. nov. Sheaths and upper surfaces of the leaves finely and closely pubescent, or only with scattered hairs (often on sheaths only, more rarely on leaves only).[1]

Agropyron caninum (L.) Beauv. var. *pubescens* Scribn. & Sm. U. S. Dept. Agr. Div. Agrost. Bull. no. 4, 29 (Feb. 6, 1897).

Specimens examined: QUEBEC, Falls of Bonaventure River, Aug. 5 6, 1904 (*J. F. Collins, M. L. Fernald*, and *A. S. Pease*); Margin of Bic River, Rimouski Co., July 29, 1907 (*M. L. Fernald* and *J. F. Collins*, no. 915); Elephantis Landing, Brome Co., July 30, 1902 (*A. S. Pease*, no. 147): NEW BRUNSWICK, Tom's Is., Restigouche River, July 30, 1896 (*G. U. Hay*): MAINE, Ledgy river bank, Houlton, Aug. 12, 1909 (*M. L. Fernald*, no. 1364); Kelly Point, Pembroke, July 31, 1909 (*M. L. Fernald*, no. 1368); City Camp to Roebar's, Valley of Wassataquoik River, July 17, 1900 (*M. L. Fernald*): NEW YORK, Axton, July 14, 1899 (*W. W. Rowlee, K. M. Wiegand*, and *G. T. Hastings*): MICHIGAN, Sulphur Is., Thunder Bay, Lake Huron, near Alpena, July 13, 1895 (*C. F. Wheeler*): OREGON, Stein's Mountains, August, 1901 (*D. Griffiths* and *E. L. Morris*, no. 609).

3. A. CANINUM (L.) Beauv. f. **glaucum** Pease & Moore, f. nov. vaginis aut foliis aut utrisque glaucis pubescentibusque ornata.

Type specimen: MAINE, Kelly Point, Pembroke, July 31, 1909 (*M. L. Fernald*, no. 1367).

4. A. CANINUM (L.) Beauv. var. **tenerum** (Vasey) Pease & Moore, comb. nov. Spikes generally very long and slender, 5.7–23 cm. long (average length about 12–14 cm.), 3–12 mm. wide, awnless or with awns up to 6 mm. in length.

Agropyrum tenerum Vasey, Bot. Gaz. x, 258 (Apr. 1885); Scribn. & Sm. U. S. Dept. Agr. Div. Agrost. Bull. no. 4, 29 (Feb. 6, 1897).

Agropyron repens (L.) Beauv. var. *tenerum* (Vasey) Beal, Grasses N. A. ii. 637 (1896).

A. Novae-Angliae Scribn. in Brainerd, Jones, and Eggleston, Flora Vt. 103 (1900), name, p. 9 (see also foot-note, p. 9).

[1] In this case hairs always scattered.

Specimens examined: Newfoundland, Bay of Islands, July 27, 1908 (*E. H. Eames* and *C. C. Godfrey*, no. 5878): Quebec, Grande Coupe, Percé, Gaspé Co., August 19, 1904 (*J. F. Collins*, *M. L. Fernald*, and *A. S. Pease*); Allen's Ravine, Mt. Albert, Gaspé Co., July 26 & 28, 1906 (*M. L. Fernald* and *J. F. Collins*); Gravelly beach, Carleton, Bonaventure Co., July 25, 1904 (*J. F. Collins* and *A. S. Pease*), with sheaths showing a glaucous tendency observable also in the next specimen to be cited; Beach near mouth of Matane R., Aug. 6, 1904 (*F. F. Forbes*); Vicinity of Cap à l'Aigle, August 8, 1905 (*J. Macoun*, Herb. Geol. Surv. Can. no. 68981); Mt. Elephantis, Brome Co., July 30, 1902 (*A. S. Pease*, no. 148): Maine, Caribou Bog, Crystal, August 16, 1900 (*M. L. Fernald*): New Hampshire, Diamond Peaks, Dartmouth College Grant, August 15, 1907 (*A. S. Pease*, no. 10501), Mt. Webster, Bean's Grant, Aug. 21, 1908 (*A. S. Pease*, no. 11722): Vermont, Canaan, July 10, 1907 (*A. S. Pease*, no. 10088): New York, Mt. Zoar, Chemung Co., July 20, 1897 (*T. F. Lucy*, no. 11603): Ontario, Kingston, July 27, 1897 (*J. Fowler*): Michigan, Sand Point, Huron Co., August 20, 1908 (*C. K. Dodge*, no. 22): Wisconsin, Milwaukee, August (*I. A. Lapham*): Minnesota, Elmore, Iowa and Minnesota Line, July 21, 1897 (*L. H. Pammel*, no. 895): Iowa, Ames, June 27, 1893 (*F. C. Stewart*, Herb. Ia. Agr. Coll. access. no. 5470): Nebraska, Grand Is., June 23, 1897 (*L. H. Pammel*, no. 60): North Dakota, Leeds, July 3, 1901 (*J. Lunell*): South Dakota, Belle Fourche, 1897 (*D. Griffiths*, no. 389 a): Montana, Indian Creek, July 4, 1883 (*F. Lamson Scribner*), "Typical, J. G. S. '96": Wyoming, East De Lacy's Creek, Yellowstone Park, August 10, 1897 (*P. A. Rydberg* and *E. A. Bessey*, no. 3694); Crazy Woman's Creek, 1897 (*T. A. Williams*, no. 2728): Colorado, Crystal Park, 2600 m., August 1, 1901 (*F. E. & E. S. Clements*, no. 179); Gunnison, July 18, 1901 (*C. F. Baker*, no. 468); Fort Garland, 1884 (*G. Vasey*), "Typical"; Buena Vista, Chaffee Co., August 17, 1896 (*C. L. Shear*, no. 1020): Idaho, Idaho Falls, July, 1893 (*E. Palmer*, no. 357): Utah, Dyer Mine, Uintah Mountains, July 12, 1902 (*L. N. Goodding*, no. 1343): California, Crosser, Yakima Co., July 19, 1902 (*J. S. Cotton*, no. 744): New Mexico, 1847 (*A. Fendler*, no. 909): Arizona, St. John's to White Mountains, August 6–15, 1903 (*D. Griffiths*, no. 5201): Saskatchewan, 1858 (*E. Bourgeau*): Manitoba, Emerson, July 17, 1887 (*J. Fowler*): Assiniboia, Moose Jaw, July 17, 1880 (*J. Macoun*): British Columbia, Trail, June 6, 1902 (*J. M. Macoun*, Herb. Geol. Surv. Can. no. 63394).

5. A. caninum (L.) Beauv. var. tenerum (Vasey) Pease & Moore f. **ciliatum** (Scribn. & Sm.) Pease & Moore, comb. nov. Sheaths furnished with pubescence, varying from a dense covering of fine hairs to more scattered and longer ones. Leaves glabrous or with scattered hairs on the upper surface.[1]

[1] In the latter case there may be no hairs on the sheaths, a phase which seems to be more frequent in the East, while the other is more abundant westward.

Agropyron tenerum Vasey var. *ciliatum* Scribn. & Sm. U. S. Dept. Agr. Div. Agrost. Bull. no. 4, 30 (Feb. 6, 1897).

A. tenerum Vasey subsp. *trichocoleum* Piper, Bull. Torr. Bot. Club, xxxii, 546 (Oct. 21, 1905).

Specimens examined: QUEBEC, Between Baldé and the Baie des Chaleurs, Bonaventure River, Bonaventure Co., August 5, 6, & 8, 1904 (*J. F. Collins, M. L. Fernald,* and *A. S. Pease*): MAINE, Lubec, Aug. 2, 1909 (*M. L. Fernald*, no. 1366); Gilead, August, 1897 (*K. Furbish*): NEW HAMPSHIRE, Randolph, August 16, 1902 (*A. S. Pease*, no. 1730), July 28, 1907 (*A. S. Pease*, no. 10769), August 17, 1907 (*A. S. Pease*, no. 10614, *A. H. Moore*, no. 4050); Three Mile Island, Meredith, Aug. 25, 1903 (*A. S. Pease*, no. 2515): VERMONT, Westmore (Type station of *A. Novae-Angliae*), July 11–12, 1900 (*W. W. Eggleston*, no. 2177): MICHIGAN, Keweenaw Co., August, 1889 (*O. A. Farwell*, no. 533): NORTH DAKOTA, Devil's Lake, Ramsay Co., July 1, 1905 (*J. Lunell*): WYOMING, Bridger Peak, Carbon Co., August 22, 1903 (*L. N. Goodding*, no. 1939); WASHINGTON, Walla Walla, June 26, 1899 (*C. L. Shear*, no. 1573).

6. A. CANINUM (L.) Beauv. var. TENERUM (Vasey) Pease & Moore f. **Fernaldii** Pease & Moore, f. nov. glauca; foliis basalibus vaginisque pubescentibus. Aliquando folia sparsim pilosa sunt.

Type specimen: QUEBEC, Vicinity of Cap à l'Aigle, August 8, 1905 (*J. Macoun*, Herb. Geol. Surv. Can. no. 68978).

Other specimens examined: QUEBEC, Mt. Ste. Anne, Percé, Gaspé Co., July 24, 1905 (*J. F. Collins* and *M. L. Fernald*, no. 36); Vicinity of Cap à l'Aigle (*J. Macoun*, Herb. Geol. Surv. Can. no. 68979): MAINE, Kelly Point, Pembroke, July 31, 1909 (*M. L. Fernald*, no. 1369); West Quoddy Head, Lubec, Aug. 2, 1909 (*M. L. Fernald*, no. 1365).

7. A. CANINUM (L.) Beauv. var. **latiglume** (Scribn. & Sm.) Pease & Moore, comb. nov. Spikes rather broader in proportion to the length than in the following, 2.2–8.2 cm. long, 5–10 mm. wide; glumes flattened out (i. e., almost or wholly without keel); spikelets and leaves finely pubescent.

Agropyron violaceum (Hornem.) Lange var. *latiglume* Scribn. & Sm. U. S. Dept. Agr. Div. Agrost. Bull. no. 4, 30 (Feb. 6, 1897).

A. violaceum (Hornem.) Lange subsp. *latiglume* (Scribn. & Sm.) Piper, Bull. Torr. Bot. Club, xxxii, 547 (Oct. 21, 1905).

Specimens examined: Bear Lake; Arctic Coast (T., 65): GRINNELL LAND (*A. W. Greely*, no. 69): LABRADOR, Rama, August 20–24, 1897 (*J. D. Sornborger*, no. 263): WYOMING, Summit Mt., Bighorn Mountains, 10,000 ft., July 24, 1900 (*J. G. Jack*), "typical"; Rocky Mountains (*Douglas*, no. 77).

8. A. CANINUM (L.) Beauv. var **Hornemanni** (Koch) Pease & Moore, comb. nov. Generally plants of alpine or far northern regions; spikes 4.2–11.3 cm. long (average about 7–8 cm.), 3–9 mm. broad (average about 6 mm.); glumes strongly keeled; spikelets not pubes-

cent, simply minutely ciliate on the edges of the glumes,[1] leaves narrow or even revolute[2] to flat and broadish.

T. biflorum Authors, not Brign., e. g. Nym. Consp. Flor. Europ. 842 (1878–1882).

T. violaceum Hornem. Flora Dan. xii, t. 2044 (1834).

T. biflorum Brign. β. *Hornemanni* Koch, Syn. Flor. Germ. Helv. ed. II, ii, 953 (1844).

Agropyrum biflorum (Brign.) R. &. S. var. *Trit. violaceum* (Hornem.) Reichenb. Ic. Flor. Germ. Helv. i, 30 (1850).

A. violaceum (Hornem.) Lange, Consp. Flor. Groenl. 155 (1880); Vasey, Dept. Agr. Spec. Rep. no. 63, 45 (1883); Scribn. & Sm. U. S. Dept. Agr. Div. Agrost. Bull. no. 4, 30 (Feb. 6, 1897).

A. violaceum (Hornem.) Lange β. *virescens* Lange, Consp. Flor. Groenl. 155 (1880); Rosenv. Andet. Till. Grønl. Faner. Karsp. 726 (1890).

A. violaceum (Hornem.) Lange α. *genuina* Rosenv. Andet. Till. Grønl. Faner. Karsp. 726 (1890).

A. violaceum (Hornem.) Lange var. *major* Vasey, Contr. U. S. Nat. Herb. i, 280 (Oct. 31, 1893).

Agropyron brevifolium Scribn. U. S. Dept Agr. Div. Agrost. Bull. no. 11, 55 (July 20, 1898).

Triticum repens L. B. *T. biflorum* (Brign.) A. & G. A. *virescens* (Lange) A. & G. Syn. Mitteleurop. Flora, ii, 1, 654 (Dec. 10, 1901).

T. repens L. *B. T. biflorum* (Brign.) A. & G. B. *Hornemanni* (Koch) A. &. G., l. c.

Agropyrum violaceum (Hornem.) Lange f. *virescens* (Lange) Gelert, in Ostenfeld, Flora Arct. 133 (June 28, 1902).

Specimens examined: Greenland, Igalisso (*J. Vahl*): Quebec, Gulch north of Lac au Diable, Mt. Albert, Gaspé Co., July 25, 1906 (*M. L. Fernald*, no. 411): Maine, North Basin, Mt. Ktaadn, July 13, 1900 (*E. F. Williams*): New Hampshire, Alpine Garden, Sargent's Purchase, August 19, 1907 (*A. S. Pease*, no. 10600), August 7, 1896 (*E. & C. E. Faxon*); Oakes' Gulf, Cutts' Grant, August 8, 1896 (*E. F. Williams*): Wyoming, Yellowstone Lake, August 22, 1899 (*A. Nelson*, no. 6608): Colorado, near Pagosa Peak, 12000 ft., August, 1899 (*C. F. Baker*, no. 144a); North Fork of Bridge Creek, September, 1897 (*A. D. E. Elmer*, no. 676) — Type of *A. brevifolium* Scribn.): Nevada, near Virginia City, 1863–4 (*H. G. Bloomer*, no. 2068) — Mixed with variety no. 7: California, Silver Mt. Trail, 8000–9000 ft., 1864 (*W. H. Brewer*, no. 2068): Alberta, Devil's Head Lake, Banff, July 29, 1901 (*J. Macoun*): British Columbia, Chilliwack Valley, August 29, 1901 (*J. M. Macoun*, Herb. Geol. Surv. Can. no. 26026).

9. A. caninum (L.) Beauv. var. Hornemanni (Koch) Pease &

[1] In the White Mountains spikes generally green and thick. N. B. the ciliation referred to is characteristic of the entire group.

[2] Very narrow or revolute leaves are not common in the group.

Moore f. **pilosifolium** Pease & Moore, f. nov. foliis supra sparsim pilosis.[1]

Type specimen: MAINE, Dead River, Somerset Co., August 19, 1896 (*M. L. Fernald*, no. 576).

10. A. CANINUM (L.) Beauv. var. **andinum** (Scribn. & Sm.) Pease & Moore, comb. nov. Length of the spikes (without the terminal awns) 4.3–9.5 cm. (mostly 5–7 cm.); width (exclusive of the awns) 5–8 mm.; awns 9–20 mm. long, slightly spreading, not strongly recurved as in the following.

Agropyron violaceum (Hornem.) Lange var. *andinum* Scribn. & Sm. U. S. Dept. Agr. Div. Agrost. Bull. no. 4, 30 (Feb. 6, 1897).

A. biflorum (Brign.) R. & S. subsp. *andinum* (Scribn. & Sm.) Piper, Bull. Torr. Bot. Club, xxxii, 547 (Oct. 21, 1905).

A. andinum (Scribn. & Sm.) Rydb. Flora Colo. 54 (1906).

Specimens examined: MONTANA, Cedar Mt., July 16, 1897 (*P. A. Rydberg* and *E. A. Bessey*, no. 3705): WYOMING, Dunraven Peak, August 27, 1899 (*A. & E. Nelson*, no. 6726); Telephone Mines, Albany Co., August 1, 1900 (*A. Nelson*, no. 7894): COLORADO, Silver Plume, August 24, 1895 (*C. L. Shear*, no. 393); Mt. Kelso, near Torrey's Peak, 13000 ft., 1885 (*G. W. Letterman*).

11. A. CANINUM (L.) Beauv. var. **Gmelini** (Ledeb.) Pease & Moore, comb. nov. Size of spikes as in the preceding; awns tending to be longer, 1.2–3.3 cm. long, bent outward almost at right angles, or, at least, strongly recurved.

Triticum caninum L. var. *Gmelini* Ledeb. Flora Alt. i, 118 (1829); Ic. Pl. nov. imperf. cogn. Flor. Ross. iii, 16, t. 248 (1831), Griseb. according to Scribn. & Sm. U. S. Dept. Agr. Div. Agrost. Bull. no. 4, 31 (Feb. 6, 1897), not Triticum Gmelini Trin. ex Schrad. in Linnaea, xii, 467 (1838), "radix repens."

Agropyrum caninum (L.) Beauv. var. *Gmelini* Ledeb., according to Vasey, Bull. Torr. Bot. Club, x, 128 (Dec. 1883), publ. without reference to a previously described plant and hence invalid.

Agropyron Gmelini (Ledeb.) Scribn. & Sm. U. S. Dept. Agr. Div. Agrost. Bull. no. 4, 30 (Feb. 6, 1897).

Specimens examined: WYOMING, Meeteetse Creek, 1897 (*T. A. Williams*, no. 2911); Telephone Mines, Albany Co., August 1, 1900 (*A. Nelson*, no. 7892): COLORADO, Silver Plume, August 24, 1895 (*P. A. Rydberg*, no. 2453): Buena Vista, Chaffee Co., August 14–20, 1896 (*C. L. Shear*, no. 1013): IDAHO, Mt. Chauvet, July 29, 1879 (*P. A. Rydberg* and *E. A. Bessey*, no. 3712): CALIFORNIA, Carson Pass (*W. H. Brewer*, Cal. State Surv. no. 2118).

12.[2] A. CANINUM (L.) Beauv. var. GMELINI (Ledeb.) Pease &

[1] Besides this difference from the common White Mountain plant, the sterile shoots are more abundant, a character which is not likely to prove important.

[2] Nos. 7–12, incl. do not average as tall as nos. 1–6 incl., seldom having to be bent to get them on to a sheet. Nos. 13 and 14 are of like stature with nos. 1–6.

Moore f. **Pringlei** (Scribn. & Sm.) Pease & Moore, comb. nov. Leaves (rarely the sheaths also) finely and densely pubescent, or with scattered hairs on one or both sides.

Agropyron Gmelini (Ledeb.) Scribn. & Sm. var. *Pringlei* Scribn. & Sm. U. S. Dept. Agr. Div. Agrost. Bull. no. 4, 31 (Feb. 6, 1897).

A. Scribneri Vasey, Bull. Torr. Bot. Club, x, 128 (Dec. 1883); Scribn. & Sm. l. c.

Specimens examined: Montana, Little Belt Mountains, August 12, 1883 (*F. Lamson Scribner*, no. 427), "A. Scribneri, Type": Wyoming, Medicine Bow Mountains, Albany Co., August 31, 1903 (*L. N. Goodding*, no. 2043): Colorado, Gray's Peak and vicinity, 11–14000 ft., August, 1885 (*H. N. Patterson*, no. 162); near Pagosa Peak, 12000 ft., August, 1899 (*C. F. Baker*, no. 141): California, Summit Valley, Sierra Nevada Mountains, September 23, 1882 (*C. G. Pringle*) — Type of *A. caninum.* var. *Pringlei.*

13. A. caninum (L.) Beauv. var. unilaterale (Cassidy) Vasey. Size of spikes as in the type, except that the awns usually give them the appearance of being wider (6–8 mm.); awns ascending or appressed (generally unequally so, giving the spikes a unilateral appearance), from 2–5 cm. long (average 3–4 cm.).— Contr. U. S. Nat. Herb. i. 279 (Oct. 31, 1893).

Agropyrum unilaterale Cassidy, Colo. State Agr. Coll. Exper. Sta. Bull. no. 12, 63 (July, 1890); Scribn. & Sm. U. S. Dept. Agr. Div. Agrost. Bull. no. 4, 29 (Feb. 6, 1897).

Agropyron caninum (L.) Beauv. f. *violacescens* Ramaley, Geol. Nat. Hist. Surv. Minn.— Minn. Bot. Studies, Bull. no. 9, 3, 107 (June 9, 1894).

A. violacescens (Ramaley [1]) Beal, Grasses N. A. ii, 635 (1896).

A. violascens Scribn. & Sm. U. S. Dept. Agr. Div. Agrost. Bull. no. 4, 29 (Feb. 6, 1897).

A. Richardsoni (Trin.) Schrad. according to Scribn. & Sm. l. c., probably not A. Richardsoni Hort. Berol., Ind. Sem. Hort. Bot. Berol. 1831 Collect. (1832), nomen nudum.

Triticum Richardsoni Scribn. & Sm. l. c., not T. Richardsoni Schrad., Linnaea, xii, 467 (1838), Trin. according to Scribn. & Sm. l. c.

Specimens examined: District of Columbia, Plot 151, Potomac Flats, June 19, 1902 (*Pollock* and *Ball*)—Mixed with no. 4: Colorado, Dillon (*C. L. Shear*, no. 1067); Twin Lakes, 1873 (*J. Wolfe*, no. 1168): Oregon, ("*Dr. Gardner*"): Alberta, Devil's Head Lake, Banff, August 3, 1891 (*J. Macoun*), with comparatively short awns: Assiniboia, Eagle Hills, July 25, 1879 (*J. Macoun*); Cypress Hills, August 2, 1880 (*J. Macoun*).

14. A. caninum (L.) Beauv. var. unilaterale (Cassidy) Vasey f. **ciliatum** (Scribn. & Sm.) Pease & Moore, comb. nov. Sheaths varying

[1] Erroneously cited by Beal as R. Pound from the title-page of an earlier article on the Mucoraceae.

from pubescent to sparsely pilose; leaves sometimes glabrous, sometimes with scattered hairs.

Agropyron Richardsoni (Trin.) Schrad. var. *ciliatum* Scribn. & Sm. U. S. Dept. Agr. Div. Agrost. Bull. no. 4, 29 (Feb. 6, 1897).

Specimens examined: NEW YORK?, Ex Coll. G. W. Clinton, "Buffalo, N. Y." [1]: ONTARIO, Near Shannonville, Hastings Co., June 2, 1865 (*J. Macoun*, no. 3): IOWA, Jewell Junction, July, 1895 (*G. W. Carver*, no. 255): MONTANA, Hound Creek Valley, August 1, 1883 (*F. Lamson Scribner*, no. 422); Dry Fork of Belt Creek, August 14, 1896 (*P. A. Rydberg*, no. 3352): NORTH DAKOTA, Leeds, July 8, 1901 (*J. Lunell*): BRITISH COLUMBIA, Field, August 19, 1904 (*J. Macoun*, Herb. Geol. Surv. Can. no. 64790).

TWO NEW GALIUMS FROM NORTHEASTERN AMERICA.

M. L. FERNALD and K. M. WIEGAND.

UNTIL twelve years ago the group of slender, flaccid, blunt-leaved plants, of which *Galium trifidum* L. is the type, was supposed to be represented in North America by *G. trifidum* itself with two varieties and by the little known *G. Brandegei* Gray of the southern Rocky Mountains. In 1897,[2] however, it was shown to consist of seven clearly marked species and several varieties; and subsequently one of the plants of northeastern America, then considered a variety, has been found worthy of specific rank as *G. labradoricum* Wiegand.[3]

For several years there has been collected, chiefly on salt marshes and brackish soils about the Gulf of St. Lawrence, in eastern Newfoundland and in eastern Maine, a plant which, in habit and elongate arching pedicels, is clearly a phase of *Galium trifidum*. But this plant of saline soils is almost invariably smooth, in all the material examined nearly or quite lacking the retrorse-scabrous character of true *G. trifidum*; and it has slightly larger fruit, the mature carpels being 1.5–1.75 mm. in diameter. On the other hand, all the material of *G. trifidum* from situations which are not saline is harsh with minute

[1] It is uncertain whether "Buffalo, N. Y.," is only the collector's address or also the place of collection.

[2] Wiegand, Bull. Torr. Bot. Cl. xxiv. 389–403 (1897).

[3] RHODORA, vi. 21 (1904).

retrorse prickles which occur upon the stems, leaves, and pedicels; and its mature carpels are 1.25–1.5 mm. in diameter. The smooth plant appears to be a well marked halophytic variety, which is here proposed as

Galium trifidum L., var. **halophilum**, n. var., omnino ut *G. trifidum* sed caulibus foliis pedicellisque glabris; carpellis maturis paulo majoribus (1.5–1.75 mm. diametro).

Like the typical form of the species, but with stems, leaves, and pedicels glabrous; fruit slightly larger (the individual carpels 1.5–1.75 mm. in diameter).— Quebec: brackish marshes at mouth of Bonaventure River, August 2–4, 1904, *Collins, Fernald, & Pease*, (type specimen in Gray Herb.); borders of a salt marsh, Matane, August 6, 1904 (*F. F. Forbes*); brackish shore, Rivière du Loup, August 31, 1904 (*Collins & Fernald*); salt marsh, Bic, July 25, 26, 1907 (*Fernald & Collins*, no. 1181). Newfoundland: Barred Islands, August 20, 1903, *J. D. Sornborger*. Prince Edward Island: bog near Tracadie Beach, July 27, 1901, *J. R. Churchill*. New Brunswick: brackish marsh at mouth of Tête-à-Gauche River, Bathurst, July 24, 1902, *Williams & Fernald*. Maine: North Lubec, September, 1902, *Kate Furbish*; edge of salt marsh, South Lubec, July 26, 1909 (*Wiegand*); pools and wet rocks by the sea, Cutler, July 2, 1902, *Kennedy, Williams, Collins, & Fernald*, August 19, 1902, *Kate Furbish*.

Another plant related to *Galium trifidum* has been collected in Arbor Vitae swamps and on marly or calcareous shores of Gaspé County, Quebec, and Aroostook County, Maine. This plant, which had been placed tentatively with *G. trifidum*, var. *subbiflorum* Wiegand, is densely matted, and has the tiny fruits on glabrous pedicels which are only 0.5–4 mm. long, and the mature carpels 0.8–1 mm. in diameter. From typical *G. trifidum* it differs in its short internodes, short glabrous pedicels, and smaller fruit; the fully developed retrorse-scabrous pedicels of *G. trifidum* being 0.8–2 cm. long, and the ripe carpels 1.25–1.5 mm. in diameter. From *G. trifidum*, var. *subbiflorum*, which has glabrous pedicels, it is readily distinguished by its very short pedicels and small fruit; from var. *halophilum* by its slightly scabrous stems, very short pedicels, and tiny fruit; and from *G. Brandegei* Gray, of the southern Rocky Mountains, by its more scabrous stems and leaves, shorter pedicels, and smaller fruit, the mature carpels of *G. Brandegei* being 1.7–2 mm. in diameter. So far as the writers are able to find, the small-fruited plant of Quebec and Maine has not been described, and it may appropriately be called

Galium **brevipes**, n. sp., humile valde implicatum, caulibus

0.5–3 dm. longis ramosissimis glabrescentibus vel paulo retrorso-scabris, internodiis longioribus 1–3 cm. longis; foliis plerumque 4^is subinequalibus oblanceolatis vel oblongo-lanceolatis obtusis cuneatis 2–10 mm. longis 1-nerviis glabris vel margine et subtus in nervo scabris; floribus axillaribus solitariis vel binis; pedicellis arcuatis glabris demum 0.5–4 mm. longis; corollis minutis albidis, lobis 3 obtusis; fructu glabro, carpellis maturis 0.8–1 mm. diametro, endospermo in sectione transversali annulare.

Plants low and densely matted; the stems 0.5–3 dm. long, freely branched, smoothish or somewhat retrorse-scabrous, the longer internodes 1–3 cm. long: leaves mostly in 4s, somewhat unequal, oblanceolate to oblong-lanceolate, obtuse, cuneate at base, 2–10 mm. long, 1-nerved, smooth or somewhat retrorse-scabrous on the margin and midrib beneath: flowers axillary, solitary or paired: pedicels curved, glabrous, finally 0.5–4 mm. long: corolla minute, 3-lobed, the lobes obtuse, whitish: fruit glabrous, the mature carpels 0.8–1 mm. in diameter; cross-section of the endosperm annular.— QUEBEC: exsiccated marl-pond near mouth of the Grand River, Gaspé County, August 11–15, 1904, *Collins, Fernald & Pease*, (type specimen in Gray Herb.). MAINE: Arbor Vitae swamp, Mars Hill, September 8, 1896, *Fernald*: muddy flat of the Meduxnekeag River, New Limerick, August 13, 1909, *Fernald & Wiegand — Fernald*, no. 2169.

A NEW VARIETY OF RHAMNUS CAROLINIANA.— While attempting to find better characters for the separation of *Rhamnus caroliniana* Walt. and *R. Frangula* L. than those stated in the seventh edition of Gray's Manual,[1] I noticed that, although most of the material of *R. caroliniana* has glabrous or glabrate leaves, there are several sheets of specimens in the Gray Herbarium on which the mature leaves are densely velvety beneath, thus differing pronouncedly from the typical form of the species. This extreme variation may be called

RHAMNUS CAROLINIANA Walt., var. **mollis**, n. var., foliis maturis subtus velutinis.— KENTUCKY: without statement of locality, *C. W. Short*. ILLINOIS: Grand Tower, *Geo. Vasey* (type, in Gray Herb.). TEXAS: creek-banks, Houston, April 3, 1872, *E. Hall*, no. 99; uncommon in woods, Columbia, April 15, 1899, *B. F. Bush*, no. 165.— M. L. FERNALD, Gray Herbarium.

[1] The mature leaves of *Rhamnus Frangula* are 3–7 cm. long, short-oblong to obovate; and the pedicels and calyces are glabrous or essentially so. The mature leaves of *R. caroliniana*, which apparently is unknown in the Atlantic States north of Virginia, are 4–15 cm. long; and the pedicels are distinctly pubescent, the calyx pubescent or rarely glabrate.

Botrychium obliquum var. oneidense in eastern Massachusetts.— I am indebted to Prof. B. L. Robinson for the identification as *Botrychium obliquum* var. *oneidense* (Gilbert) Waters of a sheet (No. 277) in my herbarium, which I collected on 8 March, 1909, in Canton, Mass. The plants were growing in rather rich soil along the edge of a shady road bordered by woods. This is apparently the first record of this variety for the eastern part of the state.— Sidney F. Blake, Stoughton, Massachusetts.

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THE NORTH AMERICAN VARIATIONS OF JUNCUS EFFUSUS.

M. L. Fernald and K. M. Wiegand.

Perhaps no species of the genus *Juncus* is more familiar than is *Juncus effusus* L., largely because of its wide distribution in temperate regions of both the Northern and Southern Hemispheres. Like most species of almost cosmopolitan range, however, it has developed certain pronounced geographic variations, many of which have been described either as varieties or as distinct species, but few of which have been recognized by American students of the genus. During the past summer, while botanizing extensively in eastern Maine and adjacent New Brunswick, the writers became convinced, from their field observations, that as represented in that district *Juncus effusus* consisted of several well-marked varieties or possibly species. Subsequent study of all the material in the Gray Herbarium, the herbaria of the New England Botanical Club, the Geological Survey of Canada, the Philadelphia Academy of Natural Sciences, and the Philadelphia Botanical Club, and the private collections of Messrs. H. H. Bartlett, Walter Deane, G. G. Kennedy, and other members of the New England Botanical Club, has shown that not only are there several good varieties in eastern America, but that in the main the plants of the Pacific Slope represent a different series of variations. In all these plants the general habit is very similar and the perianths, capsules, and seeds are in their more important characters essentially the same. In fact, though showing marked varietal tendencies in the size and texture of the culms; the texture, size, and color of the basal sheaths; the size and branching of the inflorescence; the texture, length, and color of the perianth-segments; and the color and size of the capsules;

many of the extremes seem to pass by transitional specimens to one or another of the other varieties. A prolonged study of the group as represented both in America and in the Old World has failed to bring out such beautifully clear lines of demarcation as are now known to separate the species of the *Juncus tenuis* group (until recently aggregated as *J. tenuis*), so that the writers, at present, do not feel justified in treating them as more than geographic varieties of a cosmopolitan type.

In any critical study of the group which passes under the general name of *Juncus effusus* the first requisite, of course, is the identification of the typical form of *J. effusus* L. This seems nearly impossible except by circumstantial evidence, since the original treatment of the species was so very uncritical. The typical form, however, must have been from Europe, so it has seemed desirable to determine first whether we have in America anything that will match with sufficient closeness anything in Europe. In the Gray Herbarium there are many sheets of *J. effusus* from various parts of Europe, but after prolonged study we have reluctantly come to the conclusion that there is nothing in America closely similar to those European sheets which agree best with the descriptions given by recent European authors of typical *J. effusus*. This European material all agrees in having very small flowers with a comparatively soft perianth after the manner of var. *compactus*; and it seems probable that the var. *compactus* is really only *J. effusus* with a more condensed inflorescence than the most typical form of the species. The basal sheaths in the European plants may be pale or dark (var. *atratus* Aschers. & Graebner, Syn. ii. pt. 2, 443, 1904). In America the only forms (except var. *compactus*) which might possibly be considered as identical with the European *J. effusus* are those here treated as var. *solutus* and var. *decipiens*. The former, var. *solutus*, though having a similar stature and pale sheaths, nevertheless differs from the European in the more rigid and appressed perianth and very diffuse inflorescence which is even larger than that of the hollow-stemmed European var. *fistulosus* Buch. The var. *decipiens*, in the size of the flowers, texture of the perianth, and size of the inflorescence agrees well with the European material, but in the slender wiry culms with very dark reddish-brown sheaths is unlike any material we have seen from Europe, but on the other hand matches almost exactly all the material in the Gray Herbarium from eastern Asia.

That the American and European material of *Juncus effusus* is not identical seems to have been first noticed by Rostkovius in 1801, but apparently his discriminating observation has been overlooked by most later authors. He says: "Specimens of this species from North America seem to differ a little in color, for the petals even in fruiting flowers are green; otherwise the structure of all parts is the same as in ours." [1]

In their distribution in North America the varieties of *Juncus effusus* are confined to the regions east of the Great Plains and west of the Rocky Mountain System, mostly at comparatively low altitudes, being apparently unknown on the Great Plains or in the Rocky Mts. In the East they rarely extend westward beyond the region of the Great Lakes and the Mississippi Basin except on the southern coastal plain. In the West they are unknown east of British Columbia, Washington, Oregon and California. This extreme isolation of the plants may to some extent account for the fact that we do not find identical varieties upon the eastern and western edges of the continent.

The different forms of *Juncus effusus* in America, as we have identified them, may be distinguished as follows:

A. Flowers small, sepals 1.7–2.6 (rarely 2.9) mm. long, mostly somewhat spreading from the base: perianth-segments not very dark but usually with two distinct brown lateral bands, rather soft in texture and therefore not rigid when dry: inflorescence small (1–4 cm. in diameter), or if larger with the sepals less than 2.6 mm. long.

  Culms rather stout, 1.5–4 mm. in diameter at the top of sheaths: sheaths pale: inflorescence small, compact.

    Culms finely many-striate and usually deep-green var. *compactus.*

    Culms coarsely 12–15-sulcate, usually pale-green var. *conglomeratus.*

  Culms rather slender, 1–2 (rarely 3) mm. in diameter at the top of the sheaths: sheaths dark: inflorescence small and rather close. var. *decipiens.*

  Culms very slender, 1–1.5 mm. in diameter at the top of the sheaths: sheaths pale: inflorescence much more open, loosely fastigiate. var. *exiguus.*

B. Flowers of medium size, sepals 2.5–2.9 (rarely only 2) mm. long, rarely spreading: perianth-segments very dark-brown, mostly soft in texture, therefore not rigid when dry, each with two broad dark-brown lateral

[1] Specimina huius speciei ex America boreali colore parum differre videntur, sunt enim petala etiam in fructiferis floribus viridia; ceterum structura omnium partium eadem ac in nostra.— Rostk. Dissert. de Junco, 11 (1801).

bands: inflorescence from dense to somewhat loose (1–4 cm. in diameter).
Uppermost sheath close, coriaceous, lustrous, usually castaneous throughout . . . . var. *gracilis.*
Uppermost sheath looser, membranous, dull, greenish-drab above. var. *brunneus.*

C. Flowers medium or large, sepals 2.5–4.2 mm. long (rarely shorter): perianth-segments with no very conspicuous brown bands, frequently firmer in texture, often rigid, appressed or somewhat spreading: inflorescence commonly open, rarely somewhat dense, 1.5–14 cm. in diameter.
Summit of the uppermost sheath broad, usually emarginate, the edges much overlapping almost or quite to the tip; and with the cluster of veins very strongly converging at the summit: sheaths rarely paler above: inflorescence conspicuously fastigiate. . . . var. *pacificus.*
Summit of the uppermost sheath somewhat narrowed, merely rounded, the edges not overlapping within 1 cm. of the top; veins much less strongly converging: upper sheaths much paler above: inflorescence irregularly spreading, rarely slightly fastigiate.
Sepals rarely exceeding either the petals or the capsule, 2.5–3.5 mm. long, firm, not conspicuously spreading nor strongly contrasting in color with the capsule: culms 2–4.5 mm. in diameter at the top of the sheaths, not sulcate . . . . .var. *solutus.*
Sepals exceeding both the petals and the capsule, 3–4.2 mm. long, firm or rigid in texture and usually somewhat spreading, commonly contrasting in color with the darker capsule: culms 1–3.5 mm. in diameter at the top of the sheaths, finely striate or deeply sulcate. var. *Pylaei.*

Juncus effusus L. Sp. Pl. 326 (1753). *J. communis β effusus* E. Meyer, Junci Gen. Monog. Sp. 22 (1819).

The typical form in Europe seems to be a plant of medium stature with non-sulcate culms and pale basal sheaths; the flowers small with soft perianth; the inflorescence also small. It has not yet been seen by us from America.

Var. compactus Lejeune et Courtois, Comp. Fl. Belg. ii. 23 (1831). *J. conglomeratus* L. Sp. Pl. 326 (1753) probably in part. *J. effusus* var. *conglomeratus* of many authors, in part, not Engelm.— Plants tall and rather stout, deep-green, 4.5–12. dm. high: culms usually firm, faintly many-striate. 1.5–4 mm. in diameter at the top of the sheaths: sheaths large and rather loose, dull, pale- or chocolate-brown below; the uppermost rather thin, pale-brown or stramineous toward the summit, 6–14 cm. long: involucral leaf 7–20 cm. long: inflorescence small compact and dense, 1–4.5 cm. in diameter: perianth-divisions rather noticeably spreading from the base, soft in texture, curved and wrinkled when dry; the midrib broad and pale, with no conspicuous dark lateral bands; the margins broadly scarious; sepals 1.8–2.5 mm.

long, about equaling the petals: capsule olive-brown, rounded or slightly retuse and sometimes umbonate at apex, about equaling the perianth.— Typical specimens examined: NEWFOUNDLAND: Bay of Islands, September 2, 1897, *Waghorne*, no. 41, August 10, 1899, *Waghorne*, no. 64; Bay St. George, August 5–7, 1901, *Howe & Lang*, no. 1031; near Topsail, Conception Bay, August 12–19, 1901, *Howe & Lang*, no. 1264; bank of Rennie's River, St. Johns, July 31, 1894, *Robinson & Schrenk*, no. 132. PRINCE EDWARD ISLAND: Tracadie Beach, July 29, 1901, *Churchill*. NOVA SCOTIA: Big Intervale, Cape Breton Island, July 18, 1898, *J. Macoun*, no. 20,730; North Sydney, July 21–25, 1901, *Howe & Lang*, no. 654; Sydney, August 17, 1902, *Fernald*; Kentville, August 22, 1902, *Fernald*. NEW BRUNSWICK: Scovil's Brook, Westfield, August 8, 1909, *Fernald & Wiegand*. MAINE: Pembroke, August 15, 1909, *Fernald & Wiegand*; Squirrel Island, August 2, 1892, *Fernald*; Long Island, Portland Harbor, August 14, 1904, *Chamberlain & Fellows*, no. 716. MASSACHUSETTS: Brush Hill Turnpike, Milton, July 7, 1853, *Wm. Boott*; Otis, September 22, 1904, *R. Hoffmann*. BRITISH COLUMBIA: vicinity of Ucleulet, Vancouver Island, Aug. 9, 1909, *J. Macoun*, no. 78,085, said to have been introduced with Cranberry plants and moss from Nova Scotia. (Also in Europe.)

The variable size and diffuseness of the inflorescence in the different varieties of *J. effusus* may lead to some confusion in the interpretation of this variety. Although occasional specimens with condensed inflorescences of var. *solutus*, var. *Pylaei*, var. *brunneus*, var. *gracilis*, and perhaps of other varieties occur, the condensed character in this case accompanies definite structural characteristics, and seems to be fairly constant. The var. *compactus*, therefore, seems to be, in America, a real variety and not made up of forms with condensed inflorescences of different varieties. This variety differs from var. *solutus* in the compact inflorescence of smaller flowers with softer more spreading and more scarious perianth; from var. *decipiens* in the stouter culms with paler basal sheaths; and from var. *Pylaei* in the stouter culms with pale basal sheaths and condensed inflorescences of smaller flowers with shorter and much less rigid perianth. From var. *conglomeratus* it may be distinguished by the absence of coarse striations or ridges on the culm below the inflorescence; and from var. *brunneus*, with which it might be confused in the Northwest, by its coarser habit, paler flowers, broader less attenuate perianth-segments, and especially by its broad-ovate less attenuate prophylla, which in var. *brunneus* are narrow-ovate and long-attenuate.

Var. COMGLOMERATUS Engelm. in Gray, Manual, ed. 5, 537 (1867).

J. Leersii Marsson, Fl. Neu-Vorpomm. u. Rügen, 451 (1869). *J. conglomeratus* Robinson & Fernald in Gray, Manual, ed. 7, 273 (1907), perhaps of L. Sp. Pl. 326 (1753) in part; also cf other authors. — Plants tall and rather stout, 6–10 dm. high, pale green; the stems easily compressible, faintly striate below, conspicuously 12–15-sulcate under the inflorescence, 1.5–2.5 mm. in diameter at the top of the sheaths; the latter rather loose, thin, light-brown below; the uppermost greenish above and 8–17 cm. long: involucral leaf 4–18 cm. long: inflorescence in American plants very congested (1–2.7 cm. in diameter): perianth 1.7–2.7 mm. long, soft, when dry wrinkled and curved; midrib of the color of the stem, bordered by pale brown bands and with narrow scarious margins: capsule about equaling the perianth, stramineous below, more or less tinged with deep-brown above, obtuse or retuse and varying from blunt to apiculate.— Typical specimens examined: Newfoundland: near Placentia Junction, August 11, 1894, *Robinson & Schrenk*, Whitbourne, August 16, 1894, *Robinson & Schrenk*, no. 133. Connecticut: in a wet bog, Franklin, July 20–23, 1907, *R. W. Woodward*. New Jersey: Egg Harbor, Atlantic Co., June 21, 1908, *E. B. Bartram*. (Also in Europe.) Specimens credited to Nova Scotia in the 7th edition of Gray's Manual prove to be immature material of some other variety.

Recent authors both in this country and abroad have been inclined to treat this variety as a distinct species on the basis of its retuse capsules and coarsely striate stems. Neither of these characters, however, is distinctive since the capsules of var. *brunneus* are often retuse, and the culms of var. *Pylaei* are frequently as coarsely striate. In our opinion, the variety in question does not differ more from the other varieties than they do from each other. The practice of treating it as a distinct species, therefore, seems scarcely warranted. The synonymy of var. *conglomeratus* is much confused. In the *Species Plantarum* Linnaeus included a *J. conglomeratus*, based upon earlier descriptions which, on careful analysis, apply (at least in part) as well or even better to var. *compactus*. Moreover, according to Buchenan, specimens labeled *J. conglomeratus* in the Linnean Herbarium are not of our variety; and other early authors employing the name *conglomeratus* failed to distinguish between the striate-culmed plant and var. *compactus*. The first unequivocal application of the name to the form with prominently striate culms, so far as we have been able to determine, was made by Engelmann in the 5th edition of Gray's Manual. The variety is readily distinguished by the very small flowers borne in a condensed head, rather soft perianth, strongly striate or sulcate culms and pale sheaths.

Var. DECIPIENS Buchenau in Engler's Bot. Jahrb. xii. 229 (1890).— Plants slender, 4–7 dm. high: culms rather wiry, finely and inconspicuously many-striate, 1–2 (rarely 3) mm. in diameter at the top of the sheaths: sheaths rather firm but not coriaceous, dark reddish-brown at base; the uppermost either dark-brown or greenish toward the summit, mostly 8–12 cm. long: involucral leaf 10–25 cm. long: inflorescence small, varying from rather dense to somewhat lax, 1.5–3 (rarely 4.5) cm. in diameter: perianth 2.5–2.9 mm. long, soft, somewhat curved and wrinkled when dry, more or less spreading, either concolorous or the scarious margins more or less irregularly suffused with reddish-purple: capsule short and rather turgid, equaling or slightly shorter than the perianth, olive-brown, often suffused with reddish-purple; summit very obtuse, not apiculate.— Typical specimens examined: NEWFOUNDLAND: Placentia, August 24, 1894, *Robinson & Schrenk*. QUEBEC: Vicinity of Cap à L'Aigle, August 18, 1905, *J. Macoun*, no. 68,858. ONTARIO; Plevna, July 28, 1902, *J. Fowler*; Cache Lake, Algonquin Park, July 11, 1900, *J. Macoun*, no. 21,997. MAINE: Southport, July 31, 1894, *Fernald*. NEW HAMPSHIRE: East Andover, August 13, 1903, *M. A. Day*; Jaffrey, July 16, 1897, *B. L. Robinson*, no. 302. MASSACHUSETTS: Ipswich, *Oakes*. (Also in eastern Asia).

Differs from var. *Pylaei* in the small flowers with short soft perianth, and from var. *solutus* in the more slender culms, darker more slender and commonly shorter sheaths, usually smaller inflorescence, and smaller flowers with softer perianth. This variety was described by Buchenau from Japanese material and credited by him to Japan only. It was distinguished only on the basis of its obtuse, not retuse, and less-completely 3-celled capsule. Judging from the conditions in other varieties, however, these are characters of comparatively slight importance, and are found in much of our American material. Nevertheless, all of the East Asian material in the Gray Herbarium is of one kind, unlike anything we have seen except the plants above cited from Newfoundland, eastern Canada and New England. It seems reasonably certain therefore that Buchenau had in hand plants of our present variety when describing var. *decipiens*.

Var. **exiguus**, n. var., caulibus tenuibus 4–6 dm. altis 1–1.5 mm. diametro, fortasse pallide viridibus firmis lentis in statu sicco subtiliter et aequaliter sulcatis; cataphyllis basilariis subcoriaceis fulvis basi rufescentibus, supremis 9–11 cm. longis; inflorescentia laxe fastigiata 4–5.5 cm. longa; bractea infima 4–10 cm. longa; perianthiis 2 mm. longis, sepalis et petalis mollibus in statu sicco marcidis curvatis, dorso viridescentibus vel fulvis, lateraliter fulvis, marginibus angustis scariosis; capsulis perianthium vix aequantibus fulvo-olivaceis non apiculatis.

Culms of medium height, very slender, 4–6 dm. high, probably pale-green, firm and wiry in texture, evenly and finely striate throughout, 1–1.5 mm. in diameter at the top of the sheaths: sheaths of medium firmness, pale brownish-rufescent below; the uppermost greenish toward the summit and 9–11 cm. long; involucral leaf 4–10 cm. long: inflorescence loosely fastigiate, 4–5.5 cm. long: perianth very small, 2 mm. long, soft, when dry wrinkled and curved; midrib greenish or tinged with pale-brown, bordered with pale-brown bands and narrow scarious margins: capsule scarcely equaling the perianth, pale olive-brown, not apiculate.— California: Yosemite Valley, July, 1866, *H. N. Bolander*, no. 4949 (type in Gray Herb.), also *Bolander* in Engelm. Herb. Junc. Bor. Am. Norm. no. 9.; Clark's Ranch [Wawona], 1865, *J. Torrey*, no. 529.

This variety is usually quite distinct in appearance. It may be recognized by the very small pale flowers in open fastigiate inflorescences, and the very slender culms with pale sheaths.

Var. gracilis Hooker, Fl. Bor. Am. ii. 190 (1840).— Plant slender, 6–8 dm. high: culms rigid and wiry, faintly many-striate throughout, 1–1.5 mm. in diameter at the top of the sheaths: sheaths close, coriaceous, lustrous, castaneous throughout; the uppermost 7–11 cm. long: involucral leaf 5–9 cm. long: inflorescence small, varying from rather dense to somewhat open, 1.5–4 cm. long: perianth 2–2.9 mm. long, soft, when dry more or less wrinkled and curved; midribs greenish, very slender, bordered by very broad dark-brown bands and an almost obsolete scarious margin; sepals very slender-pointed: capsule scarcely equaling the perianth, olive-brown, obtuse and usually short-mucronate.— Typical specimens examined: British Columbia: Burrard Inlet, July 22, 1889, *J. Macoun*, no. 27,851; vicinity of Vancouver, July 28. 1908, *Macoun*, no. 78,083. Washington: foot-hills of the Olympic Range, June 5, 1902, *J. M. Grant*, no. 117; salt marsh, Lilliwaup, Hood's Canal, July 2, 1890, *L. F. Henderson*, no. 1860; by springs on mountains, western Klickitat County, July 6, 1892, *W. N. Suksdorf*, no. 2157. California: Thistle Springs, Mt. Sanhedrin, Lake County, July 23, 1902, *A. A. Heller*, no. 5956.

A portion of the Suksdorf material was kindly compared by Dr. Otto Stapf with Hooker's original specimens at Kew and he states that the two are undoubtedly the same.

Var. brunneus Engelmann, Trans. St. Louis. Acad. ii. 491 (1868). *J. effusus*, var. *hesperius* Piper, Contrib. U. S. Nat. Herb. xi. 180 (1906).— Plants tall and rather slender, 5–10 dm. high: culms rather rigid, inconspicuously many-striate, 1.2–2.4 mm. in diameter at the top of the sheaths: sheaths loose, membranous, reddish-brown at base; the uppermost much paler and greenish-drab toward the summit, mostly 10–15 cm. long: involucral leaf 7–15 cm. long: inflorescence small, varying from dense to rather loose, 1–3 cm. in diameter: peri-

anth 2.4–2.9 mm. long, soft, wrinkled when dry; midrib greenish, very slender, bordered by very broad dark-brown bands and a nearly obsolete scarious margin: sepals less slender-pointed than in the last variety: capsule about equaling the perianth, olive-brown, often castaneous at the obtuse or slightly retuse short-apiculate summit. — Typical specimens examined:— British Columbia: Sooke, Vancouver Island, August 2, 1893, *J. Macoun*, no. 511; Renfrew, Vancouver Island, June–July, 1901, *Rosendahl & Brand*, no. 39; Alberni, Vancouver Island, in salt marshes, August 2, 1887, *J. Macoun*, no. 27,850; vicinity of Nanaimo, July 4, 1908, *J. Macoun*, no. 78,080, July 10, no. 78,081; vicinity of Ucleulet, July 16, 1909, *J. Macoun*, no. 78,082. Washington: without locality, 1852, *J. G. Cooper*, no. 7; Montesano, Chehalis County, June 27, 1898, *A. A. & E. G. Heller*, no. 3970; Southbend, August 17, 1899, *W. J. Spillman*. Oregon: John Day, Clatsop County, August 20, 1902, *E. P. Sheldon*, no. 11,206. California: marshes, San Francisco, *Bolander*, no. 151; shore of Bolinas Bay near San Francisco, August 12, 1866, *Kellogg* in Engelm. Herb. Junc. Bor. Am. Norm, no. 10; large bogs in wet sandy soil, Lobos Creek near San Francisco, August 4, 1866, *Kellogg* in same, no. 11; near Ocean View, San Francisco, June 8, 1906, *A. A. Heller*, no. 8386; Pacific Grove, Monterey County, July 1, 1905, *C. P. Smith*, nos. 1093 and 1001.

In "*Das Pflanzenreich*" Buchenau takes up the name var. *aemulans* for this variety, based on the *J. aemulans* of Liebmann (in Vidensk. Meddel. nat. For. Kjöbenh. 38, 1850). Liebmann's description was based, however, on material from southern Mexico, and since we have seen no material of the present variety from that region, so far disconnected from its usual range, it seems unwise, without further knowledge of Liebmann's plant, to treat it as identical with var. *brunneus* Engelm. This variety and var. *gracilis* both have the same dark-colored perianth of similar rather soft texture, but may easily be distinguished by the basal sheaths. From var. *compactus*, which has been found on Vancouver Island, var. *brunneus* is quickly distinguished by its slender habit, darker flowers, and more slender and attenuate perianth-segments and prophylla.

Var. **pacificus** n. var., caulibus crassis 6–13 dm. altis 2–3.5 mm. diametro rigidis obscure multi-striatis; cataphyllis basilariis castaneis opacis chartaceis, supremis 6–15 cm. longis, marginibus fere ad apicem subtruncatum vel emarginatum arctissime imbricato-convolutis, venis ad apicem valde convergentibus; inflorescentia plerumque laxe fastigiata 2.5–15 cm. longa; bractea infima 6–20 cm. longa; sepalis 2.7–3.5 mm. longis submollibus quam petalis vix longioribus, dorso fulvo-viridibus gracilibus, marginibus fulvis scariosis; petalis similibus; capsulis perianthium vix aequantibus.

Plant rather large and stout, 6–13 dm. high or possibly more: culms rigid, faintly many-striate, 2–3.5 mm. in diameter at the top of the sheaths: sheaths chocolate-brown or castaneous at base or throughout and dull, chartaceous; the uppermost pale or dark toward the summit, 6–15 cm. long, the edges much overlapping nearly or quite to the sub-truncate or emarginate tip, the veins strongly converging at the summit: involucre 6–20 cm. long: inflorescence usually loosely fastigiate, rarely more spreading, 2.5–15 cm. long: sepals 2.5–3.5 mm. long, rather soft, scarcely longer than the petals; midrib pale greenish-brown, not very broad nor bordered by dark bands, but with pale-brownish scarious margins: petals similar: capsule about equaling the sepals, olive-brown, obtuse or slightly retuse, slightly apiculate. — Typical specimens examined: British Columbia: Barclay Sound, Vancouver Island, August 2, 1887, *J. Macoun*, no. 27,848; vicinity of Victoria, Vancouver Island, July 21, 1893, *J. Macoun*, no. 512; Burrard Inlet, July 27, 1889, *J. Macoun*, no. 27,849; vicinity of Nanaimo, July 6, 1908, *J. Macoun*, no. 78,078. Washington: Seattle, June 23, 1889, *C. V. Piper*, no. 1029; Union Lake, King County, August 5, 1890, *W. N. Suksdorf*, no. 1010; Waitsburg, July 31, 1897, *R. M. Horner*. Oregon: Calapooya Valley, Douglas County, alt. 3500 ft. July 17, 1899, *M. A. Barber*, no. 109; Wilamette Heights, Portland, July 7 and August 24, 1902, *E. P. Sheldon*, no. 10,832 (type in Gray Herb.). California: Mariposa Big Trees, July, 1866, *Bolander*; near Ukiah, Mendocino County, July 9, 1902, *A. A. Heller*, no. 5838; San Ysabel, San Diego County, June 20, 1903, *Leroy Abrams*, no. 3783; Fredalba, San Bernardino Mts., July 22, 1902, *Leroy Abrams*, no. 2797.

Rather easily recognized by the peculiar summit of the upper sheath and the fastigiate inflorescence. In some respects it seems intermediate between the var. *brunneus* and the eastern var. *solutus*. From the former it differs especially in the two characters mentioned above and also in the much paler flowers; from var. *solutus* it may be recognized by the same two characters and the less rigid perianth. The only other form with similar fastigiate inflorescence is the very slender small-flowered var. *exiguus*.

Var. **solutus** n. var., caulibus crassis pallide viridibus 6–17 dm. altis, 2–4.5 mm. diametro plerumque mollibus obscure multi-striatis; cataphyllis basilariis laxis basi fulvis, supremis membranaceis ad apicem fulvis vel stramineis interdum utrinque fuscis 9–28 cm. longis; inflorescentia laxis saepe diffusissimis 4–14 cm. diametro; bractea infima 1–4 dm. longa; sepalis 2.7–3.3 mm. longis subrigidis subappressis quam petalas vix longioribus subconcoloribus, dorso viridescentibus vel fulvis; maginibus angustis scariosis; petalis similibus; capsulis fulvis vel fulvo-viridibus paulo retusis perianthium aequantibus vel paulo superantibus.

Plants tall and stout, pale-green, 6–17 dm. high: culms usually soft (in the Southern States commonly firmer), faintly many-striate, 2–4.5 mm. in diameter at the top of the sheaths: sheaths large, rather loose, pale chocolate-brown below; the uppermost membraneous and pale-brown or stramineous toward the summit, rarely dark throughout, 9–28 cm. long: involucral leaf 1–4 dm. long: inflorescence loose, often very large and diffuse, 4–14 cm. in diameter: sepals 2.7–3.3 mm. long, rather stiff and rigid (less so in southern material), the tips subappressed, about equaled by the petals; the back broad, greenish or pale-brown, usually not bordered by brown lateral bands and as broad as or broader than the narrow scarious margins; petals similar: capsule pale- or greenish-brown mostly slightly retuse, equaling or slightly longer than the perianth.— Typical specimens examined: Nova Scotia: "rare in low ground," Sydney, August 17, 1902, *Fernald*; Whycocogmah, Cape Breton Island, July 22, 1883, *J. Macoun*; near Pictou, July 12–18, 1901, *Howe & Lang*, no. 475; Halifax Harbor, September 2–6, 1901, *Howe & Lang*, no. 1523; New Brunswick: Scovil's Brook, Westfield, August 8, 1909, *Fernald & Wiegand*, *Fernald*, no. 2223 (type in Gray Herb.). Maine: Pembroke, August 15, 1909, *Fernald & Wiegand*; Orono, July, 1890, *Fernald*; Gilead, July, 1897, *Kate Furbish*; Bristol, August 6, 1897, *E. B. Chamberlain*, no. 413; East Auburn, July 19, 1886, *E. D. Merrill*, no. 1046. New Hampshire: Warren, July 22, 1908, *E. F. Williams*. Massachusetts: Ipswich, *Wm. Oakes*; Revere, August 4, 1907, *H. H. Bartlett*, no. 881; Scituate, July 10, 1898, *E. F. Williams*; Centreville, August 19, 1901, *Clara Imogene Cheney*; Pittsfield, September 23, 1899, *R. Hoffmann*. Rhode Island: Providence, June, 1845, *Geo. Thurber*, August 25, 1892 and July 30, 1893, *J. F. Collins*. Connecticut: Colebrook, September 5, 1899, *Fernald*; East Haven, June 20, 1886, *A. L. Winton*. New York: Tannersville, July 28, 1903, *C. S. Williamson*, Herb. Acad. Phila., no. 508,454. New Jersey: Seabright, June 24, 1892, *Ida A. Keller*; Barnegat City, July 17, 1909, *Bayard Long*; Winslow, July 27, 1901, *Witmer Stone*, no. 1808. Pennsylvania: Lehigh Co., 1887, *A. F. K. Krout*; Island Park above Easton, July 14, 1897, *T. C. Porter*; West Philadelphia, June 14, 1894, *A. MacElwee*, Herb. Acad. Phila., no. 517,955; Perkiomen, July 29, 1891, *Joseph Crawford*, Herb. Acad. Phila., no. 504,523. North Carolina: Biltmore, July 1, 1897, Biltmore Herb. no. 4086. South Carolina: no locality, *M. A. Curtis*: Santee Canal, *H. W. Ravenel*; Aiken, July 1866, *H. W. Ravenel* in Engelm. Herb. Junc. Bor. Am. Norm. no. 8. Georgia: Clarke County, June 18, 1900, *R. M. Harper*, no. 3; near Savannah, June 17, 1903, *R. M. Harper*, no. 1834. Florida: Eustis, Lake County, April 21, 1894, *G. V. Nash*, no. 452. Indiana: Marion County, July 6, 1904, *H. H. Bartlett*; Licking, Blackford County, July 16, 1905, *C. C. Deam*, no. 34. Illinois: Jackson, July 22, 1899, *I. M. Clokey*. Tennessee: Henderson, June, 1892, *S. M. Bain*, no. 226, in part. Arkansas:

Washington County, May, 1880, *F. L. Harvey*, no. 14. Texas: no locality given, *Berlandier*, no. 1942.

This is the common form on the coastal area all the way from Nova Scotia southward and again in the lower Mississippi Valley. The coarse habit, pale sheaths, loose inflorescence, and pale flowers with stiff perianth which is rarely longer than the capsule and usually appressed to it, serve ordinarily to distinguish this variety from others. Forms with the inflorescence comparatively dense are not rare, however, in which case it is difficult to separate them from var. *compactus*, except by the larger, firmer and more appressed perianth. In eastern and central Pennsylvania there is a form in all respects like typical var. *solutus* except that the perianth-segments are less appressed, thus suggesting (according to the length of the sepals) var. *Pylaei* on the one hand and a loosely flowered var. *compactus* on the other. In form and texture the perianth-segments are as in var. *solutus* and for the present the plant is treated as an extreme form of that variety.

Var. **Pylaei** (Laharpe) n. comb. *J. Pylaei* Laharpe, Mem. Soc. d'Hist. Nat. Par. iii. 119 (1827).— Plants varying from slender to stout, 3–11 dm. high: culms varying from coarse and soft to slender, rigid and wiry, and from conspicuously few-sulcate to obscurely many-striate under the inflorescence, 1–3.5 mm. in diameter at the top of the sheaths: sheaths rather loose, reddish-purple and often very dark at base; the uppermost membranous toward the summit, varying from purplish to greenish-drab, 4–10(–19) cm. long: involucral leaf 1–3 dm. long: inflorescence from dense to very loose, 1.5–8 cm. in diameter: perianth 3–4.2 mm. long, rather stiff and rigid: sepals somewhat spreading, distinctly exceeding the petals, the tips long-subulate; the back very broad, green, bordered with very slender often nearly obsolete light-brown bands and broad scarious margins; petals similar but shorter and less subulate-tipped: capsule olive-brown, rounded at the tip, distinctly shorter than the sepals, not apparently apiculate.— Typical specimens examined: Newfoundland: Salmonier River, August 26, 1894, *Robinson & Schrenk*, no. 131. Quebec: Little Métis, July 27, 1906, *J. Fowler*. New Brunswick: Bocabec, July 19, 1900, *J. Fowler*; Scovil's Brook, Westfield, August 8, 1909, *Fernald & Wiegand*. Maine: Fort Fairfield, August 10, 1909, *Fernald & Wiegand*; Perry, August 15, 1909, *Fernald & Wiegand*; Foxcroft, August 26, 1896, *Fernald*; Orono, July 16, 1890, *Fernald*; Rumford, July 4, 1890, *J. C. Parlin*; Wilson's Mills, Magalloway River, July 29, 1903, *E. F. Williams*. New Hampshire: White Mountains, July 28, 1853, *Wm. Boott*; Jaffrey, July 16, 1897, *B. L. Robinson*, no. 301. Vermont: Middlebury, July 13, 1878, *E. Brainerd*; Manchester, July 3, 1898, *M. A. Day*, no. 301. Massachusetts: Spot Pond, Middlesex County, July 10, 1853, *Wm. Boott*; Reading, July 12, 1882, *W. H.*

Manning; Eastham, July 9–10, 1907, *F. S. Collins*, nos. 240 and 261; Adams, August 20, 1901, *M. A. Day*, no. 88; Glendale, August 10, 1904, *R. Hoffmann*. CONNECTICUT: Colebrook, September 5, 1909, *Fernald*; Southington, July 14, 1896, *L. Andrews*, no. 185; New Haven, June 13, 1886, *A. L. Winton*. NEW YORK: near summit of a mountain, alt. 2000 ft., Atwell, Herkimer County, July 13, 1902, *J. V. Haberer*, no. 1940. PENNSYLVANIA: Buck Hill Falls, Monroe Co., July 10–14, 1903, *Witmer Stone*, nos. 5387 and 5392; Lopez to Bella Sylva, alt. 2000–2300 ft., Sullivan and Wyoming Cos., *Witmer Stone*, no. 161. WEST VIRGINIA: Blister Swamp, Randolph County, September 15, 1904, *J. M. Greenman*, no. 112. MICHIGAN: Detroit, August 15, 1866, *J. M. Bigelow* in Engelm. Herb. Junc. Bor. Am. Norm. no. 7; Keweenaw County, August, 1886, *O. A. Farwell*, no. 465; Fayette, August 20, 1901, *M. A. Barber*. WISCONSIN: Milwaukee, *I. A. Lapham*.

Apparently more northern in its distribution than var. *solutus*. Very variable, especially as to the culms which are either slender or coarse, strongly sulcate or nearly smooth, but all the forms intimately connected by intermediates. The variety may be recognized most easily by the rather large rigid perianth (the sepals longer than the petals) which usually exceeds the capsule and contrasts in color with it. When present, the coarse sulcate striations of the culm are also characteristic. The sheaths are in color more like those of var. *decipiens*.

CRATAEGUS VIRIDIS L. IN VIRGINIA.

W. W. EGGLESTON.

Crataegus viridis was first reported from Virginia by John Clayton but until recently had been seen by no one since Clayton's time, one hundred and seventy-five years ago.

In 1907 I saw, in the United States National Herbarium, a specimen of L. F. Ward's labeled "*Crataegus coccinea*, Chesapeake City, Md., May 12, 1877." This proved to be *C. viridis* L. and I so reported it in Gray's New Manual.

Last year I wrote Professor Ward to find out more in regard to the station and received this answer: — "I have looked up my notes for

May 12, 1877 and find that a party consisting of Dr. Chickering, Mr. Morong and myself landed at Fortress Monroe early that morning, botanized around there in the forenoon, and walked to Hampton in the afternoon, collecting on the way. The plants not growing in the vicinity of Washington are enumerated, but *Crataegus* is not among them. After naming three species of *Ranunculus* collected between Fortress Monroe and Hampton the note-book reads 'together with some plants known to grow about Washington, but which seemed to exhibit peculiar forms.' I presume that the *Crataegus* was among these latter. It incidentally notes that 'Dr. Chickering staid all night with a minister in Chesapeake City, who brought our things from Ft. Monroe, and Mr. Morong and I came on to Hampton and took rooms at the hotel.' This is the only mention of Chesapeake City, and I am wondering whether I did not mean Elizabeth City. Why I should have said 'Md.' instead of 'Va.' is beyond my comprehension."

I then wrote Dr. J. W. Chickering. He says this: — "Please excuse my delay, but I wanted to look over my herbarium and see if any of my specimens of that collection were from anywhere north of the vicinity of Hampton. I find so far as I can see, that all that collection was made between Hampton and Dismal Swamp and nothing north of that region."

I have since examined Dr. Chickering's herbarium, at Gallaudet College, Washington, D. C., and did not find the *Crataegus*. Elizabeth City is probably but a few miles south of Clayton's station, but in the same general region. Mr. Alfred Rehder, of the Arnold Arboretum, found *Crataegus viridis* on the Blackwater River near Zuni, Va., in 1908.

I have no doubt that the species will be found more common than supposed, in the low lands along streams in eastern Virginia, as it occurs in northern North Carolina in similar situations. My own No. 4007 from Finchley, Va., Aug. 1908, may prove to be a young shoot of this species.

New York Botanical Garden.

REPORTS ON THE FLORA OF THE BOSTON DISTRICT,—VII.

In preparing this list, the committee has continued the practice of giving records of existing specimens collected more than fifty years ago, that is, before 1860. There are, however, numerous specimens collected by William Oakes, in and around Ipswich for the most part, without any dates. These have not been quoted, except where the plants are very rare. Of course they were all collected before July 31, 1848, when William Oakes met his tragic death. Another old-time collector who noted few dates was C. J. Sprague.

Where lists of towns are given for the rarer plants, the alphabetical order has been changed to the geographical order of north to south and east to west. We feel that this will be more satisfactory, and give a much better idea of plant distribution. The committee has worked from rather limited data in regard to some of the species, and if any readers of Rhodora can add anything to the facts stated here, the knowledge will be gladly received.

JUNCACEAE.

JUNCUS.

J. acuminatus Michx. Wet sandy and muddy places; common throughout. Collected by John A. Lowell in Danvers, July 1, 1846, and in Beverly, August, 1849, and by Wm. Boott in Milton, Aug. 29, 1853.

J. articulatus L. Wet soil; Stoneham, Medford, Cambridge, Mattapan [Dorchester]. There are various printed records for this species, but since the variety has been segregated, it is impossible to know just what is meant by them. The type is apparently rare in our territory.

J. articulatus L., var. **obtusatus** Engelm. Wet soil; Lowell, Stoneham, Malden, Milton and Blue Hill Reservation. Collected by Wm. Boott in "wet field near Tavern, Spot Pond, Stoneham, July 11, 1853," and at Edgeworth [Malden], July 19, 1853.

J. balticus Willd., var. **littoralis** Engelm. Moist sand, mostly brackish, all along the coast.

J. brachycarpus Engelm. Sandy bluff, Ocean Ave., Scituate (*G. G. Kennedy* Aug. 15, 1901; *G. G. Kennedy, W. P. Rich & E. F. Williams*, Sept. 8, 1901). "The first and so far as I know the only station in Massachusetts" (M. L. Fernald).

J. brevicaudatus (Engelm.) Fernald. Wet soil; from Weymouth and Milton north and west. Collected in Essex County by Wm. Oakes in April, 1848, and by Wm. Boott at Houghton's Pond, Milton, Sept. 8, 1853.

J. bufonius L. Moist soil; very common throughout. Collected by John A. Lowell in Danvers, July 1, 1846, and by Wm. Boott in Winchester, July 15, 1853.

J. bufonius L., var. **congestus** Wahlb. Clay bank, Danvers (*J. H. Sears*, July 14, 1902).

J. bufonius L., var. **halophilus** Buchenau & Fernald. Plum Island, [Essex Co.] (*Wm. Oakes*, no date).

J. canadensis J. Gay. Wet ground; common throughout. Early collected by John A. Lowell in Beverly, August, 1847, and by Wm. Boott, Mystic Pond, Sept. 12, 1849; Dorchester, Aug. 28, 1853; Milton, Aug. 29, 1853.

J. dichotomus Ell. var. **platyphyllus** Wiegand. Meadows and swamps. Chelsea (*Wm. Boott*, July 2, 1853); Stoneham (*H. J. Koehler*, Aug. 15, 1906); Middlesex Fells (*H. J. Koehler*, July 12, 1905); Lexington (*C. H. Knowlton*, July 23, 1898); Scituate near Egypt station (*G. G. Kennedy*, Aug. 15, 1901).

J. effusus L., var. **compactus** Lejeune & Courtois. Ipswich (*Wm. Oakes*, no date); "Brush Hill turnpike left hand going from town just before getting to second toll-house."[1] Milton (*Wm. Boott*, July 7, 1853).

J. effusus L., var. **decipiens** Buchenau.[2] Ipswich (*Wm. Oakes*, without further date).

J. effusus L., var. **Pylaei** (Leharpe) Fernald & Wiegand. Boggy meadows and pond borders. Reports from Ward Hill, Bradford (part of Haverhill), Ipswich (*Wm. Oakes*), Beverly (*John A. Lowell*, August, 1846), Reading, Spot Pond, Stoneham (*Wm. Boott*, July 10, 1853), Milton, Canton, Norfolk, and South Hanson. It doubtless occurs throughout our area.

[1] For the precise location of this vaguely stated station we are indebted to the patient researches of Dr. George G. Kennedy.

[2] Owing to Fernald and Wiegand's recent segregation of *Juncus effusus* L. the distribution of the various varieties in the region under consideration is not very well understood as yet, as collectors have not looked especially for the different forms.

J. effusus L., var. **solutus** Fernald & Wiegand. Low ground, meadows, marshes, and shores of ponds and streams. Reported from many stations throughout the district except in the extreme northern, western and southern portions, where it is doubtless common. It was collected by Wm. Boott in "upland, wet meadow," Winchester, July 5, 1853. This is our common form.

J. filiformis L. Shore of Merrimac River, Lawrence (*A. S. Pease*, June 10, 1903); "Concord (E. S. Hoar; specimen in herb. of)" according to Dame & Collins, Fl. Middlesex Co. 109 (1888).

J. Gerardi Loisel. Salt marshes; common. As reports show its abundance along the Charles River as far up as East Watertown, it will be interesting to note how long this species persists under the changed conditions caused by the Charles River Dam. Fresh water and a permanent level will have no little effect on the halophytes which have heretofore flourished along this estuary. Specimens were collected by Wm. Oakes, Ipswich, 1833; John A. Lowell, Beverly, July 16, 1846; Cambridge, June 16, 1846; Wm. Boott, Edgeworth [Malden] July 9 and July 19, 1853; Medford, June 20, 1858.

J. Greenei Oakes & Tuckerm. In barren, generally dry soil, common.

In the Gray Herbarium are two sheets collected by Wm. Oakes, "in arenosis siccis ad Ipswich." To one of these is attached the following autograph letter from the collector: "For Dr. Gray. This is probably a new species, and not fit to distribute. I should not disdain to stand godfather to it myself. This I suppose was first found by me as early as 1825, perhaps some years earlier. I showed it to Tuckerman at Plymouth in 1839, who sent specimens to Torrey, and I sent abundant specimens in flower and in fruit to Torrey & Gray this spring.— Sand, Ipswich, Mass."

The plant was finally published by Oakes & Tuckerman (Am. Jour. Sci., xlv. 37 (1843)). It was named for Mr. Benjamin D. Greene, the first President of the Boston Society of Natural History.

J. marginatus Rostk. Damp ground, common throughout. Collected in Danvers by John A. Lowell in August, 1849, and at Chelsea Beach Island [Revere] by Wm. Boott, Sept. 10, 1853.

J. militaris Bigel. Margins of ponds and streams; well distributed, but rather local. Collected by John A. Lowell in Wenham, July, 1847. Round Pond, Tewksbury, is the type station for this species, as it was discovered there by Mr. B. D. Greene. Dr. Jacob Bigelow

published it in the second edition (1824) of his Florula Bostoniensis, on page 139.

T. nodosus[1] L. Concord (*Horace Mann*, 1862. Specimen in herb. W. Deane).

J. pelocarpus May. Wet sandy and swampy grounds; not reported south of Norfolk, but generally distributed in the rest of the region. Collected by John A. Lowell in Essex, August, 1848, and Beverly, August, 1849; and by Wm. Boott in West Cambridge, Aug. 20, 1853.

J. secundus Beauv. Dry sandy or rocky places; Medford, Winchester, Lexington, Cambridge, Wellesley, Framingham, Blue Hill Reservation.

J. tenuis Willd. Fields, roadsides and meadows; common throughout. Collected by F. Boott in Cambridge, 1819; by John A. Lowell, Roxbury, June 9, 1846, and Beverly, Aug. 9, 1846; and by Wm. Boott in Dorchester, July 3, 1853.

J. tenuis Willd., var. **anthelatus** Wiegand. Andover (*A. S. Pease*, July 10, 1904); path, Blue Hill, Milton (*G. G. Kennedy*, July 9, 1899); old clay borrow-pit, abundant, Lamb Hill, Framingham (*A. J. Eames*, Sept. 21, 1909).

J. tenuis Willd., var. **Williamsii** Fernald. Below tide limit, Newburyport (*M. L. Fernald*, Oct. 2, 1902); Andover (*A. S. Pease*, July 10, 1904); Edgeworth [Malden] (*Wm. Boott*, July 19, 1853); dry pasture, Lincoln (*C. H. Knowlton*, Sept. 19, 1903).

LUZULA.

L. campestris (L.) DC., var. **multiflora** (Ehrh.) Celak. Fields, meadows and open woods, in wet or dry situations; very common. Collected by Wm. Boott, in Dorchester, June 12, 1853, and by John A. Lowell in Roxbury, June, 1846.

[1] There are two specimens of *Juncus articulatus* L. in the New England Botanical Club Herbarium collected by C. E. Perkins and mounted on one sheet. This formed a part of the Middlesex Institute Herbarium which was presented to the New England Botanical Club. One specimen from "Medford or Somerville near spring and quarry behind Winter Hill, Aug. 1, 1881" is named by Dr. C. W. Swan *Juncus nodosus* L. The second specimen is labelled "Medford or vic. near Winter Hill, July 7, 1880." Under the label Dr. Swan has written, "Plants do not correspond precisely with description of *J. nodosus* in the Manual, but are like specimens in herb. C. W. Swan, so named by Wm. Boott." This explains the reference to *Juncus nodosus* in Dame & Collins, Fl. Middlesex Co. 110 (1888): "Medford (Wm. Boott; specimen in herb. of)." [W. D.]

L. saltuensis Fernald. Essex County (*Wm. Oakes*, no date, specimens in herb. Bost. Soc. Nat. Hist. and Peabody Acad. Science, Salem).

C. H. Knowlton
J. A. Cushman
Walter Deane
A. K. Harrison } *Committee on Local Flora.*

A fourth Pinus rigida for Coos County, New Hampshire. I have a fourth specimen of Pitch Pine (*Pinus rigida* Mill.) to record from Coos County, New Hampshire (see Rhodora, xi. 21 (1909). Mr. A. E. Philbrook of Philbrook Farm, Shelburne, in the southeastern part of the county, found this fourth tree on his estate in February, 1909, and he showed it to me on May 14 of the same year. The tree is about 30 meters from the one first discovered, which was "on a wooded slope about 35 or 40 meters above the intervale," and is some 6 meters higher up. It is a good specimen measuring 1.4 meters in circumference 12 decimeters above the ground, and is about 18 meters high. It is surrounded by the forest trees, but not unduly crowded by them, and is covered with cones though I was unable to find any seedlings or young trees near by. I preserved a specimen of the leaves for my herbarium. The rather surprising rarity of the Pitch Pine in Coos County may justify a printed record of this newly observed individual.— Walter Deane, Cambridge, Massachusetts.

Josselyn Botanical Society of Maine.— The annual meeting of the society will be held from July 5th to 9th, 1910, at Jackman, Maine. Headquarters will be at the New McKenny House, where a special rate of $2.25 per day has been secured. It is expected, also, that reduced rates will be obtained from the railroads in Maine. The region around Jackman has never been botanized, and it is hoped that many interesting specimens will be detected. The region offers exceptional facilities for the study of the woods, swamps, and lakes in the vicinity of the international boundary. Further information may be obtained from Dr. Ora W. Knight, 84 Forest Ave., Bangor, Maine. — Edward B. Chamberlain, *Secretary*.

THE WINTER MEETING OF THE VERMONT BOTANICAL CLUB.

Nellie F. Flynn.

The fifteenth annual winter meeting of the Vermont Botanical Club was held in Burlington, at the Williams Science Hall, University of Vermont, Friday and Saturday, January 21–22, 1910, in conjunction with the Vermont Bird Club. The joint programme was very interesting.

Twenty-four botanical papers were presented and discussed. Three of these were illustrated with lantern slides, viz: — "Forestry for Vermont," by A. F. Hawes, state forester, "The Beginnings of Sexual Reproduction in Green Plants," by Dr. Tracy E. Hazen, and "How Hybrids Give Rise to Stable Forms," by Dr. Ezra Brainerd.

The annual supper, complimentary to visiting members was held at Y. M. C. A. Hall, Friday evening. The answers to roll call were laudatory of Prof. L. R. Jones, who has gone to the University of Wisconsin, the Club thereby losing its most valuable officer.

Fifteen new members were elected and an invitation to hold the next summer meeting at Hartland and Queeche Gulf, with headquarters in Woodstock, was accepted.

Officers were elected as follows: Pres., Ezra Brainerd, Middlebury. Vice-Pres., C. G. Pringle, Burlington. Sec., Prof. H. A. Edson, Burlington. Treas., Mrs. Nellie F. Flynn, Burlington. Librarian, Miss Phoebe M. Towle, Burlington. Assistant Librarian, Miss Helen Hodge, Burlington. Executive Committee, D. S. Carpenter, Middletown Springs, Mrs. E. B. Davenport, Brattleboro, and Mrs. W. E. Mack, West Woodstock. Committee on next summer meeting, G. H. Rugg, Hanover, New Hampshire, J. G. Underwood, Hartland, and Mrs. A. B. Morgan, Hartland. Committee on next winter meeting, G. L. Kirk, Rutland, Miss Nancy Darling, Woodstock, and Miss Carrie W. Ormsbee, Brandon.

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A SUMMER'S BOTANIZING IN EASTERN MAINE AND WESTERN NEW BRUNSWICK.

M. L. Fernald and K. M. Wiegand.

Part I. General Notes on the Summer Trip.

When the time came for the final arrangement of our summer plans in 1909 we abandoned various ambitious schemes of going with our families to wild and unmapped northern regions and cast about for an area nearer home where we could combine a cool climate and a comparatively unexplored flora. This combination was finally discovered when we hit upon the easternmost section of Washington County, Maine. Although no regions of New England have been botanically explored with detail sufficient to preclude the possibility of discovering novelties or extending known ranges, we had a reasonably good superficial knowledge of the flora of the western half of the coast of Washington County from collections made at various points as far east as Machias and Cutler; but from east of Cutler the largest collections of vascular plants available were a small series of specimens gathered at Lubec in 1828 by that pioneer botanist in many New England regions, William Oakes, and a more representative collection made about North Lubec in the summer of 1902 by Miss Kate Furbish.

In Hovey's Magazine, in 1844, appeared "Some Remarks on the Botany, &c., of Eastport, Me., and its Vicinity," by "X," who, however, confined his remarks chiefly to an enthusiastic account of the astonishing fertility of the soil, the wide fame of Eastport potatoes, and a discussion of the planted trees and shrubs. This account of Eastport, which gives little detail about the native vascular plants,

contains the statement that "Its soil is rich and its crops are exuberant, affording to the enterprising farmer not only the comforts but some of the luxuries of life."[1] Contrasted with this most tempting picture of the fertility of the easternmost coast of Maine is the account given by William Oakes in a letter to his friend, Dr. James W. Robbins. Oakes, writing under date of August 14, 1828, said: "The greater part of July I have spent 'down East' even as far as Quoddy Head which lieth more eastward than Eastport. I have seen there however but few plants new to N. E. & am convinced that no great accessions to the N. E. Flora, and of absolutely new plants hardly any, are to be expected from the State of Maine."[2] These very different accounts of the Eastport district, one a picture of "exuberant" vegetation, the other of hopeless paucity of the flora, made it of more than usual interest to explore a region which could produce such contrasting effects upon the minds of casual observers. So on the morning of July 6th we were all assembled at the house of Mrs. A. C. Bridges in Pembroke, where we were to have a pleasant home for six weeks, and a workroom with impromptu tables was soon established in the barn, with abundant drying facilities on the woodpile.

Pembroke is situated on one of the northwestern arms of Cobscook Bay, which extends westward with antler-like branches from opposite the islands of Passamaquoddy Bay. It had been selected as a center for work because at Ayer's Junction, in the northwestern part of the town, the Washington County Railroad forks and we could, by means of the trains, extend our explorations east to Eastport, north to Calais and Princeton, or southwest and west as we should wish. The summer's work in Washington County actually covered much of the town of Pembroke and adjacent areas in Dennysville, Charlotte, and Perry; Moose Island in Passamaquoddy Bay, upon which is situated the town of Eastport; the eastern and southern coasts of Lubec, from Lubec village to Bailey's Mistake; and casual observations in Trescott and Whiting. Northward, the valley of the St. Croix was followed from above St. Croix Junction to Milltown and for a couple of miles below the city of Calais, and a day was spent along the course of the river between Baileyville and Princeton.

To the person from farther west, who has somehow gained the

[1] "X," Hovey's Mag. x. 405 (1844).
[2] Wm. Oakes to Dr. J. W. Robbins in letter now in possession of Mr. Walter Deane.

impression that eastern Maine is a vast wilderness, it is of great interest to find that these towns of eastern Washington County have a decided dignity and air of maturity and contentment. Several of them, in fact, were thriving communities before the end of the 18th century and Eastport (then including a part of Lubec) had become an incorporated town. Throughout this area we watched optimistically for the rich soil and exuberant crops of X's report, but if such spots existed sixty-odd years ago they were quickly built upon and not left in their primitive condition for the gratification of the present generation of botanizers. We had also been led, through the discussions in geological reports of remarkable limestone outcrops in Pembroke and elsewhere in the region, to expect a considerable degree of fertility, but the outcrops proved to be noteworthy chiefly because of the fossils they contain or for their very limited extent. Where they were found, however, we were gratified to note signs of increased fertility and an unusual abundance of *Crataegus*, or in the swamps of such plants as *Rhamnus alnifolia* L'Her. In general, however, the region is composed of highly silicious or argillacious soils, with basalts on the outer coast, and seemed to us as infertile as much of the already familiar rocky coastal strip of eastern New England.

The first impression one gains on reaching Pembroke at night or in the early morning is that he is surrounded by a typical Canadian flora. The northern *Pinaceae* — *Abies balsamea* (L.) Mill. and its var. *phanerolepis* Fernald,[1] *Picea canadensis* (Mill.) BSP., *Larix laricina* (Du Roi) Koch with either greenish or purplish cones, and *Pinus resinosa* Ait.— giving the prevailing tone to the forests. The first short walk before dinner introduced us to *Carex Houghtonii* Torr. and *C. aenea* Fernald, *Eriophorum angustifolium* Roth, *Salix balsamifera* Barratt, *Alnus mollis* Fernald, *Rubus canadensis* L., *Euphasia americana* Wettst., *Aster Lindleyanus* T. & G., *Senecio Robbinsii* Oakes, and other Canadian plants which afterward were seen almost daily. The fields and roadsides presented an appearance rather unexpected, for everywhere from Eastport to Pembroke and beyond (presumably to Cutler and Machias) were solid fields brilliantly yellow in early July with one of the King Devil Weeds, *Hieracium floribundum* Wimm. & Grab., which was found by Dr. Kennedy at Cutler in 1901 [2] and is now the worst pest of eastern Washington

[1] Rhodora, xi. 203 (1909).
[2] G. G. Kennedy, Rhodora, iv. 25 (1902)

County and adjacent New Brunswick, taking the place in this region of the Orange Hawkweed, *Hieracium aurantiacum* L., which has overrun fields of central and southern Maine but which is just entering the Passamaquoddy Bay region. In many damp fields and in roadside-ditches and thickets was a narrow-leaved Dock with stout bluntish columns of pale green, finally brownish, fruits. This was the only Dock abundant in the area and though it was clearly *Rumex Patientia* L. (supposed to be introduced) it often seemed as if quite as native as the scarcer and later-flowering *R. Britannica* L. of the swamps.

The development of these easternmost towns of Maine somewhat apart from the more westerly sections of New England is shown not only in the almost exclusive interest of the people of the coastal towns in the packing of sardines (or "near" sardines) or of the people of Calais in lumbering, but in the absence of many of our common weeds and other introduced plants and the presence of others (besides those noted above) unfamiliar in southern New England. Thus our common *Digitaria sanguinalis* (L.) Scopoli, *Ranunculus bulbosus* L., *Chelidonium majus* L., *Trifolium agrarium* L., and *Daucus Carota* L. are unknown or exceedingly rare, while *Alopecurus geniculatus* L., *Brassica alba* (L.) Boiss., *Trifolium procumbens* L., *Carum Carvi* L., *Matricaria inodora* L. and *M. Chamomilla* L., var. *coronata* (J. Gay) Cosson & Germain (see below) are among the commonest weeds. And though in most regions of New England the common planted willow is *Salix alba*, *S. fragilis* or one of their varieties or hybrids, or in other districts *S. viminalis*, in the region from Pembroke to Eastport and Lubec the common planted willow of the roadsides, now escaped and thoroughly established in thickets, is the European *S. Smithiana* Willd., a handsome species (or perhaps hybrid) with the lanceolate to oblong rugulose entire leaves satiny beneath.

Though in its general flora characteristically Canadian in type, the eastern section of Washington County presents two striking departures from the typical Canadian vegetation. These departures are singularly enough toward opposite extremes. As already emphasized by Dr. Kennedy in his notes on some of the plants of Cutler, there are many subarctic plants upon the outer coast east of Machias Bay, from which point "to Quoddy Head, a distance of about 25 miles, we have a bold shore with a full east exposure, open ocean, treacherous currents, and much fog. It is the entrance to the Bay of Fundy and from fifteen to twenty miles off shore lies Grand Manan Island with its

cliffs and fog. The Bay of Fundy, some sixty miles wide at its mouth, extends one hundred and fifty miles northeasterly, and uninfluenced by warmer currents from the southern ocean areas, maintains its well-earned reputation as a cold wet sea."[1] In the humus and heathy turf at the crests of these outer sea-cliffs and extending up Passamaquoddy Bay often as far as the eastern crests of Moose Island occur several plants which, though known slightly south of this area, are decidedly more common on the coasts of Newfoundland or Labrador. Among such plants are *Juniperus horizontalis* Moench, which was found extending up the Bay to one of the outer points in Pembroke and which follows the coast at least to southern Maine; *Iris setosa* Pall., var. *canadensis* Foster (*I. Hookeri* Penny), first noted in the United States at Cutler[2] but now known to extend south on the outer coast and islands to Great Cranberry Isle;[3] *Amelanchier oligocarpa* (Michx.) Roem., in 1909 remarkably loaded with plump juicy fruit; *Empetrum nigrum* L., wherever there is a good carpet of humus or peat; *Coelopleurum actaeifolium* (Michx.) C. & R., either on the crests, slopes or beaches; *Solidago macrophylla* Pursh, in half-shade; and *Euphrasia Randii* Robinson, with tiny, striped lilac or crimson flowers. In the more sterile places where the humus is thin and dry, as on Dog Island off Eastport or in spots on West Quoddy Head, *Euphrasia Randii*, var. *Farlowii* Robinson abounds and we were glad of several opportunities to contrast the two extremes of the species. It was while thus occupied on Dog Island, a small bare islet which is connected at low tide with Moose Island, that we had a memorable experience with the tremendous tide of these waters. We had left our rücksacks on the beach of Moose Island several feet above the water and walked dry-shod across to Dog Island where we were soon absorbed in gathering and examining the local *Euphrasia*. Suddenly looking up we saw our rücksacks nearly afloat, a swift current three feet deep rushing between us and the opposite shore, and large vessels which five minutes before had been making good headway down the Bay swept swiftly up the Bay by the rush of the incoming tide. Our collecting boxes and rücksacks (containing lunch) were soon to be overcome by the waters when a canoe with four Passamaquoddy Indians came in sight and saved us from our humble situation. But to return to the subarctic

[1] G. G. Kennedy, l. c. 23.
[2] See Kennedy, Rhodora, iv. 24 (1902); J. F. Collins, ibid. 179.
[3] E. L. Shaw, Rhodora, x. 145 (1908).

vegetation. In a rill trickling over one of the basaltic cliffs at Cutler *Montia lamprosperma* Cham. (see below) has been found, though in two hurried days along the Lubec shore we did not notice it. But on the sheer cold cliffs, below the humus-capped crests, were plants familiar at Cutler, such as *Sagina nodosa* (L.) Fenzl (typical)[1] and *Sedum roseum* (L.) Scop., and the rather ornamental annual *Senecio sylvaticus* L., which, though supposed to be introduced from Europe, avoids in a most remarkable way the cultivated areas in which the related *S. vulgaris* L. abounds. On the Nova Scotia coast of the Bay of Fundy and along the Maine coast as far south as the mouth of the Kennebec *S. sylvaticus* is a characteristic plant of rock-crevices, abounding particularly on the cold basaltic and granitic sea-cliffs.

In the heaths or raised peatbogs which abound close to the sea in this outermost coastal strip of eastern Maine are many other subarctic plants which disappear abruptly when we go inland only a short distance — often only a few rods — from the shores of the Bay of Fundy or the Atlantic. The heath-formation occurs not only in depressions or on plains where the close carpet of *Sphagnum*, *Empetrum*, &c. arches toward the center into a low dome, but in many places near the sea this heath- or bog-vegetation climbs the rocky hummocks and slopes, thus forming a continuous undulating or even abruptly sloping boggy carpet such as is familiar in the alpine regions of many of our mountains. A very characteristic example of this type was explored at the base of West Quoddy Head, Lubec, where the coastal edge of the bog (along Passamaquoddy Bay) forms a dark brown escarpment visible for some distance up the Bay, suggesting that the bog may have had a history similar to that of the Wood's Hole bog recently described by Mr. H. H. Bartlett.[2] Practically all the vascular plants of this Quoddy Head heath were such as one would expect above tree-line on Mt. Katahdin or Mt. Washington or in the subarctic tundra of Labrador — *Scirpus caespitosus* L., *Carex pauciflora* Lightf., *Comandra livida* Richardson, *Rubus Chamaemorus* L., *Empetrum nigrum* L., *Vaccinium pennsylvanicum* Lam., var. *angustifolium* (Ait.) Gray, *Aster radula* Ait., var. *strictus* (Pursh) Gray, etc. — but the most conspicuous plant at the time of our visit was *Gaylussacia dumosa* (Andr.) T. & G., forming dense depressed shrubs only 1 or 2 decimeters high, closely embedded in the *Sphagnum*, and loaded with beautiful white

[1] See Kennedy, l. c. 24.
[2] Rhodora, xi. 221–235 (1909).

or pink-tinged bells. The distribution of this very distinct *Gaylussacia* is notable, for it occurs in bogs and wet swamps all the way from Newfoundland to Louisiana, in New England at least rarely extending far from the coast. Yet the plants with which it is associated in the Lubec bog and elsewhere in eastern Maine are chiefly polar types which do not extend far southward into the temperate areas of eastern America.

The transition from the wetter portion of the heath at West Quoddy Head to the dry humus of the slopes and crests on the one hand is almost imperceptible, while in a lower depression at one edge of the bog the transition to brackish conditions is equally gradual. In this depression one of the most abundant plants is *Triglochin palustris* L. which follows the coast in brackish situations as far as Wells. Other plants of adjacent brackish and saline marshes are decidedly boreal species or varieties: *Carex norvegica* Willd., *C. salina* Wahlenb., var. *fuliginea* Blytt.,[1] *Rumex occidentalis* Watson, *Stellaria humifusa* Rottb., &c.; while the comparatively northern *Juncus bufonius* L., var. *halophilus* Buchenau & Fernald, *Polygonum Fowleri* Robinson, and *Galium trifidum* L., var. *halophilum* Fernald & Wiegand[2] are occasionally found. And in scattered heaths and boggy depressions, though not noticed in the heath at West Quoddy Head, were *Lycopodium annotinum* L., var. *pungens* Desv., the characteristic extreme of the species as it occurs on our alpine summits and in Labrador, and *Carex vaginata* Tausch, one of the common alpine sedges of the Shickshock Mts.; and in humus at Kingsport, on the Basin of Minas, at the head of the Bay of Fundy, *Loiseleuria procumbens* (L.) Desv. of our Arctic and subarctic barrens and alpine tablelands has been found.

In general this narrow coastal subarctic strip extends along the outer mainland and islands to Great Cranberry Isle, and in less pronounced development to Monhegan and even beyond, so that it will be interesting to watch at some of the more southwesterly stations for plants which as yet are not known west of the Washington County coast — such as *Lycopodium annotinum*, var. *pungens*, *Carex vaginata*, *Juncus bufonius*, var. *halophilus* (also on Plum Island, Essex Co., Massachusetts), *Comandra livida*, *Rumex occidentalis*, *Sagina nodosa* (typical), *Euphrasia Randii*, var. *Farlowii*, *Galium trifidum*, var. *halophilum*, *Solidago macrophylla*, and *Aster radula*, var. *strictus*.

[1] Our plant is var. *fuliginea* Blytt, Norg. Fl. i. 219 (1861) and, according to Kükenthal, not var. *cuspidata* Wahlenb. which is typical *Carex salina*.

[2] See Rhodora, xii. 78 (1910).

Inland from the subarctic coastal belt of vegetation, the flora, as already stated, is chiefly of the Canadian type; but near the heads of the shallower and warmer estuaries and in the valley of the St. Croix River some southern plants which seemed singularly out of place and others which there approach or perhaps attain their eastern limits were found. Thus, along the St. Croix above Calais, for example, *Sparganium eurycarpum* Engelm. (which extends into southern New Brunswick), *Fraxinus pennsylvanica* Marsh. (extending also to the lower St. John), *Cornus Amomum* Mill., *Viburnum dentatum* L., and *Cephalanthus occidentalis* L. are close neighbors of the northern *Carex chordorhiza* L. f. which above Milltown literally covers the river-meadow and there attains one of its southern limits. At Princeton the large yellow-flowered Water Crowfoot, *Ranunculus delphinifolius* Torr. carpets a mill-pond. On a sandy plain in Charlotte various southern types were seen, among them *Oenothera cruciata* Nutt., previously unknown east of the Penobscot valley, *Lechea intermedia* Leggett, and various species of *Panicum*; and in the sandy margin of Round Pond in Charlotte *Xyris caroliniana* Walt., reaches its easternmost known limit. In warm or sheltered situations in Pembroke other southern types were seen: *Carex albolutescens* Schwein. in rocky woods, *C. pennsylvanica* Lam., var. *lucorum* (Willd.) Fernald carpeting the sunny slope of an esker, *C. umbellata* Schkuhr, var. *tonsa* Fernald in profusion on a dry southerly slope, *Amelanchier canadensis* (L.) Medic., var. *tomentula* Sargent[1] on a dry ridge, *Pedicularis canadensis* L. in oak woods, *Antennaria Parlinii* Fernald beneath Sugar Maples; and in a sterile meadow a profusion of *Oenothera fruticosa* L., var. *hirsuta* Nutt., in full flower, as the splendid climax of a rainy day which had already shown us *Juncus dichotomus* Ell., var. *platyphyllus* Wiegand (extended northeastward from York and Cumberland Counties) growing in a swamp near where the rigid densely bunched *Juncus Vaseyi* Engelm. attains one of its southernmost known stations.

The distribution of *Oenothera fruticosa* and its var. *hirsuta* in Maine is not well understood. Various reports of *O. fruticosa* in the state have been based upon large forms of *O. pumila* L. and there is no positive evidence of the typical *O. fruticosa* in Maine. The var. *hirsuta* grows in profusion in open woods on the warm gravelly slope

[1] See Rhodora, xi. 47 (1909).

of an esker in the Penobscot Valley, and the related *O. pratensis* (Small) Robinson occurs on the dyked marsh at Wells (*Miss Furbish*) and at Hartford (*Parlin*). Other stations for members of the group need verification. Whether or not such plants as *Ranunculus delphinifolius*, *Oenothera cruciata*, *O. fruticosa*, var. *hirsuta*, &c., are really isolated in the warmer situations about the heads of Passamaquoddy and Cobscook Bays and in the St. Croix Valley is of course futile at present to discuss; but the presence, a few miles back from the coast, of a more or less continuous series of sand plains and barrens (such as the famous blueberry barrens north and west of Northfield and similar barrens which stretch all the way from Columbia and Cherryfield to Spectacle Pond and beyond)[1] makes it probable that further exploration will show these plants to extend somewhat generally across southern Washington County. Here, at least, is an interesting problem for those who are situated where they can explore these plains and barrens.

During our stay at Pembroke we were introduced to several food-plants which were new to our experience. The first of these was the "Waterberry," *Lonicera caerulea* L., var. *villosa* (Michx.) T. & G., which we enjoyed in some abundance for three weeks before the ripening of the Blueberries which Waterberries resemble both in appearance and taste. Another berry which was so abundant as to be quickly gathered was the Sugar Pear, *Amelanchier canadensis*, which was used in making delicious pies, in flavor resembling cherry pie. Baked Apple, *Rubus Chamaemorus* L., was an old friend of one of the party who had reveled in it on Table-top Mt., but wherever we saw it in Maine it fruited sparingly and was not up to the standard in flavor. We heard much of "Goose-tongue" as "greens" which grew along the seashores, so, supposing the name to be a modification of "Goosefoot", brought in quantities of young *Chenopodium album* L. and *Atriplex patula* L., var. *hastata* (L.) Gray, which we already knew to be among the best of greens; but we were told that Goose-tongue was entirely different, and not until we saw women walking into Lubec with baskets of the leaves of *Plantago decipiens* Barneoud were we able to identify it. The *Plantago* proved an acceptable spinach and one worth remembering in June and July.

By the first of August, the season when the early plants were all

[1] For detailed discussion see George H. Stone's "The Glacial Gravels of Maine", Mon. U. S. Geol. Surv. xxxiv. (1899).

collected, the later ones not ready to collect, and the clumps of tagged *Crataegus* and *Rubus* between flowering and fruiting, botanizing became arduous and we found ourselves lingering too long on the blueberry barrens, since, in order to get small returns in "different" things, we were forced to cover many miles of hard and comparatively sterile country. So it was decided that this was the favorable time for the two men of the party to make a trip they had talked of, up the St. John and into "the Aroostook," at the same time giving the ladies an uninterrupted week for reading, driving, and picnicking without the responsibility of washing the roots of our specimens whenever we chanced to bring in full boxes. Accordingly we went by the New Brunswick Southern Railway from St. Stephen to St. John through a coastal region much of which suggested conditions like those about Lubec. On the morning of August 6th we reached the picturesque camp of Dr. G. U. Hay at Ingleside, on the St. John in the town of Westfield, about four miles below the mouth of the Nerepis River. Here we were cordially received by Dr. and Mrs. Hay in the camp and wild garden already known to several readers of Rhodora. We were very obviously in the St. John Valley, for in the rich alluvium of the river were many plants familiar from above St. Francis to Woodstock.—*Calamagrostis neglecta* (Ehrh.) Gaertn., Meyer & Scherbius, *Salix lucida* Muhl., var. *intonsa* Fernald, *S. pellita* Anders. and *S. coactilis* Fernald, *Thalictrum confine* Fernald and *Tanacetum huronense* Nutt.— with several unknown or rare on the Upper St. John, such as *Salix nigra* Marsh., *Fraxinus pennsylvanica* Marsh., and *Stachys palustris* L. A short distance from his camp Dr. Hay showed us a fine specimen of *Acer rubrum* L., var. *tridens* Wood (noted below), and in short walks in the neighborhood other notable plants were seen —*Panicum tennesseense* Ashe, *P. implicatum* Scribner, *Glyceria laxa* Scribner and *Lycopodium sabinaefolium* Willd.

One afternoon and evening were given to a sail up the lower reaches of the St. John and the quiet winding channel of the Nerepis River. The meadows along this stream were luxuriant to a degree and we longed for more time than was available to explore them. Shoulder-high stood a dense thicket of *Scirpus pedicellaris* Fernald, *S. cyperinus* (L.) Kunth, var. *pelius* Fernald, *Zizania aquatica* L., *Sparganium eurycarpum* Engelm. and other marsh plants not generally known from so far east; and in deep water, forming broad dense islands nearly covered at high tide but rising at low tide a meter above the

surface, stood acres of clumps of *Scirpus fluviatilis* (Torr.) Gray, a stately bulrush once reported as growing at Perry, Maine, but heretofore unverified from east of the lower Merrimac. About Passamaquoddy Bay we had grown callous to the attractions of *Potentilla palustris* (L.) Scop., var. *villosa* (Pers.) Lehm., but at twilight a beautiful silvery variation of the species was found on the Nerepis marshes and a single specimen taken in the dim light "for locality," under the impression that it was var. *villosa*. Later, however, too late to return for more, it proved to be var. *subsericea* Becker (see below) a very beautiful plant, worthy a place among cultivated semi-aquatics.

A portion of another day was devoted to an interesting meeting of the Natural History Society of New Brunswick, held at the picturesque summer-cottage of Senator Ellis, in full view of the gorge and falls at the mouth of the St. John River, where are found *Saxifraga Aizoon* Jacq. and some other boreal calciphile plants. Along the river near Senator Ellis's cottage we saw *Juncus alpinus* Vill. which is common farther north; and while waiting for our return train we found the yard of the Canadian Pacific Railway at Fairville a veritable garden of ballast weeds, chiefly brought from the West, — *Gilia linearis* (Nutt.) Gray, *Ambrosia trifida* L., var. *integrifolia* (Muhl.) T. & G., *Artemisia ludoviciana* Nutt., *A. frigida* Willd., etc.

On Monday morning, August 9, accompanied by Dr. Hay, we started for Fort Fairfield near the mouth of the Aroostook River, reaching there in time for a short walk along the river before supper. Fort Fairfield for nearly a dozen seasons (at intervals since the early 60's) has furnished all the interesting material visiting botanists have been able to put up; and, although it was a familiar region to one of the party, he found at the end of the third day that, in spite of good resolutions to the contrary, his trunk was full of specimens and a large package had to be shipped to Pembroke by express. After the sterile coastal region of eastern Maine it was indeed a delight to find ourselves in a rich limestone country where we struggled through tangles of *Salix glaucophylla* Bebb and *S. pellita* Anders., with *Onoclea Struthiopteris* (L.) Hoffm. and *Bromus altissimus* Pursh brushing our faces, and *Lilium canadense* L., with ten to twenty flowers, and *Cirsium muticum* Michx. towering above our heads. Our limited time and two days of drenching rain forced us to restrict our botanizing to the shores of the Aroostook River, so, equipped with rubber coats, slouch hats and storm rubbers, we went first to the gravelly shore

back of the Collins House, a spot already familiar to a score of readers of Rhodora, where in June the gravel is brilliant with *Viola nephrophylla* Greene, *Primula mistassinica* Michx., and *Senecio Balsamitae* Muhl., with the less obvious but fully as interesting *Carex Crawei* Dewey (known from but one other station in New England — Salisbury, Connecticut) and the commonly alpine *C. scirpoidea* Michx., and *Scirpus Clintonii* Gray, a species which in central and northern Maine replaces the more southern *S. planifolius* Muhl. In early August this gravel was bright with a very luxuriant and freely flowering form of *Aster junceus* Ait. with flesh-colored rays, *Parnassia caroliniana* Michx. with large creamy-white flowers, *Potentilla fruticosa* L., a mass of golden bloom, and *Lobelia Kalmii* L. with its delicate blue and white flowers, while the misty-crimson panicles of *Prenanthes racemosa* Michx. were beginning to expand. But fully as interesting to the botanist from southern New England was the slender wiry *Sporobolus Richardsonis* (Trin.) Merr. which forms a dense mat in the edge of the river-thicket as it does throughout the upper St. John River system.

The northern half of Maine had suffered from excessive rains during July and was still suffering from them in early August, and at the time of our visit the thicket above the bridge was still loaded with comparatively fresh silt and driftwood. *Potentilla Anserina* L. (typical)[1] which abounds along the river at this point, had consequently failed to set fruit and many other plants had a drowned appearance. But at the spring where *Kobresia elachycarpa* Fernald (now overripe and unrecognizable) was first found[2] we paid our respects not only to the clear water but to the colony of plants which has already supplied scores of New England herbaria with *Equisetum variegatum* Schleicher, *Triglochin palustris* L., *Calamagrostis neglecta*, *Juncus brachycarpus* (Engelm.) Buchenau and *J. alpinus* Vill. In the thicket on the river-terrace *Castilleja pallida* (L.) Spreng., var. *septentrionalis* (Lindl.) Gray, *Aster macrophyllus* L., var. *sejunctus* Burgess, and *Anemone canadensis* L. were in their prime; and on the gravel were *Tofieldia glutinosa* (Michx.) Pers. with bright reddish capsules, *Allium Schoenoprasum* L., var. *sibiricum* (L.) Hartm. with heads resembling those of Red Clover, *Astragalus alpinus* L., var. *Brunetianus* Fernald, with delicate dark and light lavender and white flowers, and *Tanacetum*

[1] See Rhodora, xi. 8 (1909).
[2] See Rhodora, v. 247–251 (1903).

huronense Nutt., with ashy plumose foliage and large golden button-like heads.

On the broad river-beach below the Canadian Pacific station *Hedysarum boreale* Nutt. was in fine fruit, with an occasional lingering raceme of crimson flowers, and *Prunus pumila* L., which formed an extensive carpet was tantalizingly near ripeness — just green enough to be still inedible. In the thicket *Thalictrum confine* Fernald [1] was already over-ripe, but *Trisetum melicoides* (Michx.) Vasey and *Scutellaria Churchilliana* Fernald were in fine condition, and in the shade of the thicket were *Equisetum pratense* Ehrh. (formerly known from the upper St. John and the Kennebec valleys), *Viola Selkirkii*, Pursh, always local enough to be interesting, and *Pyrola asarifolia* Michx. in good fruit. Our walk in this direction took us nearly to the talus slope where *Astragalus eucosmus* Robinson abounds at its only New England station, but the already long-ignored dinner-bell and the plans for the afternoon forced us to turn back.

The northern bank of the river, always fruitful in good things, maintained its established reputation for *Juncus balticus* Willd., var. *littoralis* Engelm. and *Triglochin maritima* L. (two maritime species here more than 100 miles from the nearest salt water), *Potentilla arguta* Pursh, *Polygala Senega* L., &c.; and we found in the rich thicket two species which had not before been known so far north in Maine,— *Agrimonia gryposepala* Wallr. and *Osmorhiza longistylis* (Torr.) DC.

The last day of the Fort Fairfield trip was devoted to the cold cliffs and springy banks about the Aroostook Falls and the gorge of the river, which lie wholly in New Brunswick. The Aroostook Falls have long been known to some readers of Rhodora as the most picturesque portion of the river system and a region as rich in botanical as in scenic interest. It was, therefore, a bitter disappointment, after driving out from Fort Fairfield along the northern bank of the river to find the great wooded slope, which formerly extended from the road to the Falls and where various comparatively southern plants — *Cynoglossum boreale* Fernald, *Scrophularia leporella* Bicknell, and *Triosteum aurantiacum* Bicknell — have been found, was now a stretch of charred stumps and black skeleton-trees, burnt rocks and ashes as far as the eye could see. The fire had extended quite to the edge

[1] All the eastern material which in Rhodora, ii. 232, 233 (1900) was referred to *T. occidentale* Gray proves upon further acquaintance to be *T. confine*.

of the gorge and had burned off long-familiar patches of *Aspidium fragrans* (L.) Sw. and *Woodsia alpina* (Bolton) S. F. Gray. To complete the shock to a former lover of the Falls, a dam had been constructed and a large power-plant occupied a conspicuous place in the Basin. But neither the forest-fire nor the dam and the power-plant could completely obliterate the rush of the swirling water nor the grandeur of the place, and, intent upon visiting the long-known plants of the region and upon searching new spots, we were soon oblivious to the destruction which had been wrought. The rock-crevices, as always, were full of *Anemone multifida* Poir., *Viola labradorica* Schrank, *Solidago racemosa* Greene and *S. hispida* Muhl.; and, as on former trips, in the wet springy hollows were found *Rynchospora capillacea* Torr., *Primula mistassinica* Michx., *Lobelia Kalmii* L. (with a beautiful albino form) and *Erigeron hyssopifolius* Michx.

A "game leg" unfortunately forced Dr. Hay to abandon the lower half of the gorge and to return to smoother travel on the highroad, and we were forced to make our way without him over the ledges and through tangles to Four Falls at the mouth of the Limestone River, as it enters the Aroostook. Below the Basin the forested bank was uninjured and on the cool moist rocks *Anemone multifida* Poir., *Arabis hirsuta* (L.) Scop., *Amelanchier spicata* (Lam.) C. Koch, *Astragalus eucosmus* Robinson and *Erigeron hyssopifolius* Michx. were in much finer development than farther up-stream. At one point halfway to Four Falls we were attracted to a springy spot under the bank unusually bright with *Habenaria dilatata* (Pursh) Gray, *Parnassia caroliniana* Michx. and *Lobelia Kalmii* L.; and here we were delighted to find *Scirpus pauciflorus* Lightf. which is abundant about wet marly shores along the Limestone River in Maine but has not, apparently, been reported from New Brunswick, and *Arnica mollis* Hook., var. *petiolaris* Fernald at the first station east of Moxie Falls in Somerset County, Maine. Above the mouth of the Limestone River the gravelly flat is covered with an almost impenetrable tangle of *Crataegus*, with *Vitis vulpina* L. at its northeastern limit; and as we came up the bank along the Limestone, where *Carex eburnea* Boott (as yet unknown in Maine whose borders are close by) abounds, we found a fine clump of *Solidago altissima* L., already known from Fort Fairfield, though nowhere else in Maine or New Brunswick. We reached Aroostook Junction in season to wave a farewell to Dr. Hay who was obliged to start back to St. John on the afternoon train, and

we returned to "the Fort" with enough material to keep us busy until midnight.

At Fort Fairfield one who is familiar with the meagre soil and small farms of southern New England receives a sudden awakening, for in "the Aroostook," shut off from central Maine by the "Maine woods," the cultivated fields stretch in undulations over the hills and plains as far as the eye can reach and the return they yield through their potatoes and grain is annually counted in millions of dollars. But a greater surprise to those who have been unfamiliar with the tremendous development and activities of eastern Aroostook County is the metropolitan character of the shire-town, Houlton, where the large stone and brick business blocks, attractive stores, and commodious houses and private grounds are in marked contrast to the appearance of agricultural communities in southern New England.

We reached Houlton in the middle of the afternoon of August 12th and having three hours before supper-time followed the Meduxnekeag River for a couple of miles toward the New Brunswick border. For the most part the banks were wooded or bushy to the water's edge and only such plants as are general in the thickets along most Maine rivers were seen, but on the occasional ledgy outcrops near the water were *Carex aurea* Nutt., *Tofieldia glutinosa* (Michx.) Pers., *Viola nephrophylla* Greene, *Primula mistassinica* Michx., and some other species which indicated the calcareous nature of the rock. In the wet sedgy spots along the river and in springy spots on the hillsides was one plant which was entirely unlooked for. This was *Carex flava* L., var. *gaspensis* Fernald,[1] a distinctive extreme of the species in which the perigynia are subulate and but slightly inflated and which had been known only from marly bogs and calcareous gravels of the Gaspé Peninsula.

Wishing to spend some hours on the extensive Caribou Bog in Crystal, which had been "discovered" by one of the writers in 1898, we had planned to leave Houlton early on the morning of August 13; but the discovery of the characteristic Gaspé *Carex* induced us to sacrifice half the time planned for Crystal in order to spend the forenoon in further exploration of the region. The reputed station for *Scolopendrium vulgare* Sm. at Woodstock, New Brunswick,[2] is near

[1] Rhodora, viii. 200 (1906).
[2] See Hay, Bull. Nat. Hist. Soc. N. B. no. ii. 31 (1883).

the mouth of the Meduxenkeag farther east, but with very limited time it was useless to attempt to locate it, so it was decided to drive westward along the river to New Limerick and to take the west-bound afternoon train there. Even then we were forced to limit our real stops to two. The first was in a typical Arbor Vitae swamp near Nickerson Lake where nothing remarkable was found, but we got excellent fruiting material of *Carex vaginata* Tausch, *Cypripedium hirsutum* Mill., *Valeriana uliginosa* (T. & G.) Rydberg, and other typical plants of such swamps. The other stop was at a point where the road approaches a muddy flat of the river which is there expanded into a broad quiet pool. This stop was made primarily to gather pond weeds, but in crossing the flat we were surprised to find ourselves walking on an extensive carpet of a tiny-fruited *Galium* which had been familiar to one of us on a marly shore in Gaspé County, Quebec, the little plant recently described by us as *G. brevipes*.[1] In the river with *Potamogeton zosterifolius* Schumacher was an aquatic *Sagittaria* with small floating sagittate leaves and the pistillate flowers on slender pedicels 3–6 cm. long. We were too early for fruiting material, but the young carpels resembled those of *S. arifolia* Nutt., which, however, has much shorter fruiting pedicels (0.5–2 cm. long); and the foliage of the plant is so like that shown in the original plate of *S. cuneata* Sheldon as to suggest that with further knowledge *S. cuneata* and *S. arifolia* (which have recently been treated as identical) may prove to be distinct. Returning to the carriage, we followed a spring-rivulet to its source and were delighted to find ourselves in a dense carpet of the pretty little semi-aquatic *Ranunculus Purshii* Richards. with golden flowers only 7 mm. broad. This was another plant familiar in Gaspé but heretofore unknown in New England, and, as may well be imagined, we were loath to leave such a spot and drive on to the train. But our glimpse, if only a fleeting one, was sufficient to convince us that a river-bank in Maine which, upon the most casual examination, yields *Carex flava*, var. *gaspensis*, *Ranunculus Purshii* and *Galium brevipes* is worthy an extensive exploration. In recent years many other species, common in Gaspé but formerly unknown or very local in Maine, have been found in Aroostook County,— such plants as *Selaginella selaginoides* (L.) Link, *Carex vaginata* Tausch, *C. livida* (Wahlenb.) Willd., *Juncus stygius* L., var. *americanus* Buchenau and *Drosera lin-*

[1] Rhodora, xii. 78 (1910).

earis Goldie; and there are many other near neighbors of these plants in the marly shores and bogs of Gaspé,— *Salix candida* Flügge, *S. pseudo-myrsinites* Anders., *Drosera anglica* Huds., *Parnassia parviflora* DC., *Pinguicula vulgaris* L., &c.— which may with good hope be sought in the calcareous districts of Aroostook County.

On reaching the station at New Limerick we found the gravel about the railroad yard abounding in a plant which has been known as a weed about Lake Temiscouata in Quebec since 1887 [1] but which was quite new to our experience:— *Elsholtzia Patrini* (Lepechin) Garcke, a delicately lemon-scented mint adventive or introduced from Asia. Near by in the thicket, as if indigenous, were gigantic plants of *Iva xanthiifolia* Nutt., a plant of the West which is becoming naturalized in New England.

Caribou Bog in Crystal is too well known to many botanists to demand special description, except for the very unusual association of plants which is found there. It is a dryish marly bog with larches, spruces, and Arbor Vitae creeping in from the edges. Near the margin *Betula pumila* L. and *Lonicera oblongifolia* (Goldie) Hook. mingle with more widely known shrubs,— *Myrica Gale* L., *Pyrus melanocarpa* (Michx.) Willd., *Rhamnus alnifolia* L'Her., *Lonicera caerulea* L., var. *villosa* (Michx.) T. & G., &c. The open mucky spots are carpeted with the sprawling *Carex chordorhiza* L. f. which often seems to have ascended into the bushes by means of its long freely branching superficial rootstocks but which more probably has been left in these unusual habitats by early freshets, or the whitish green tufts of *Carex livida* (Wahlenb.) Willd.; and in many of these wetter spots are fine colonies of *Tofieldia glutinosa* (Michx.) Pers. with red capsules, *Parnassia caroliniana* L., *Utricularia cornuta* Michx., and *Lobelia Kalmii* L.; while still more locally are found beds of *Juncus stygius* L., var. *americanus* Buchenau, and *Drosera linearis* Goldie. In the slight shade of the larches or in the open are great clumps of *Phragmites communis* Trin., scattered plants of *Triglochin maritima* L., and carpets of *Pyrola asarifolia* Michx., var. *incarnata* (Fisch.) Fernald, mingled with commoner northern bog plants such as *Carex vaginata* Tausch, *Cypripedium parviflorum* Salisb., *C. hirsutum* Mill., *Habenaria hyperborea* (L.) R. Br., *Spiranthes Romanzoffiana* Cham., *Valeriana uliginosa* (T. & G.) Rydberg, &c. The open areas are comparatively dry and one can walk with ease over the dense carpet of

[1] John I. and Alice B. Northrop, Bull. Torr. Bot. Cl. xvii. 29 (1890).

mosses[1] and sedges (*Scirpus caespitosus* L., *S. hudsonianus* (Michx.) Fernald, *Carex gynocrates* Wormsk., *C. exilis* Dewey, *C. diandra* Schrank, &c.).

We went perhaps a mile back from the railroad far beyond the fringe of larches and found to the north a broad open prairie-like expanse with occasional scattered islands of small trees; and in the near distance a wonderful panorama of Mt. Katahdin. Most interesting of all the plants of this open boggy prairie was the rare and deliciously fragrant *Habenaria leucophaea* (Nutt.) Gray, somewhat like a much overgrown *H. blephariglottis* with very large creamy flowers. In the entire afternoon we saw less than a dozen plants though they were conspicuous from a distance. This extreme rarity of *Habenaria leucophaea* is of special note. No other stations are known in New England[2] and the species is nearly as rare in New York, but throughout the prairie region it is (or was) one of the characteristic plants in low areas. In studying the distribution of this rare orchid we note that the peculiar association of species which is found on Caribou Bog (and so far as we know on no other bog of New England) is repeated in many of its details on the famous Bergen Swamp in Genessee County, New York, a swamp which "has long been considered one of the most interesting botanical points in western New York,[3]" and in similar marshes in Wayne County, New York.[4] Thus, it is unusual in bogs of New England and New York to find such calciphile species[5] as *Valeriana uliginosa*, *Parnassia caroliniana*, and *Cypripedium parviflorum* associated with the calcifuge *Ledum groenlandicum* and *Arethusa bulbosa* and the commonly maritime *Triglochin maritima*; yet these plants of the Crystal bog are found in Bergen Swamp and in the marshes of Wayne County. It is also unusual to find the calciphile *Carex vaginata*, *C. gynocrates*, and *Tofieldia glutinosa*, the local (possibly calciphile) *Lonicera oblongifolia*, the commonly maritime *Phragmites communis*, and such a characteristic

[1] For notes on a few of the characteristic Bryophytes of Caribou Bog see J. F. Collins, Rhodora, x. 37 (1908).

[2] The report of *H. leucophaea* from the Dead River region (Bull. Josselyn Bot. Soc. no. iii. 19) was based upon an anomalous *H. fimbriata*.

[3] Beckwith & Macauley, Proc. Rochester Acad. Sci. iii. 10 (1894).

[4] For notes on these swamps see Beckwith & Macauley, Plants of Monroe County, New York, and adjacent Territory — Proc. Rochester Acad. Sci. iii. 1–150 (1894).

[5] The plants here spoken of as calciphile are commonly found in eastern Canada, New England and New York only on calcareous soils, while the calcifuge species are rarely (at least with us) found upon calcareous soils.

arctic-alpine sedge as *Scirpus caespitosus* (which with us is usually calcifuge) growing together, but they are common on Caribou Bog and also in Bergen Swamp. Similarly, in the Wayne County marshes and in Caribou Bog are other strange companions: the calciphile boreal *Drosera linearis*, the calcifuge boreal *Eriophorum callitrix* and *Andromeda glaucophylla*, the characteristic prairie orchid, *Habenaria leucophaea*, and the chiefly coastal *Carex exilis*; while in the Wayne County marshes and in Bergen Swamp, though not at Crystal, is the coastal *Myrica carolinensis*.

These three bog-areas, then, are very similar in their vegetation and are characterized by a remarkable aggregation of rare or local species derived from very dissimilar floras: some of the species being characteristic of the prairies of the interior, others as typical of the Atlantic coast or even of our salt marshes; some well known northern calciphile, others ordinarily as distinctly calcifuge species. The association of these plants, especially such species as *Triglochin maritima, Phragmites communis, Scirpus caespitosus, Tofieldia glutinosa, Habenaria leucophaea, Arethusa bulbosa, Drosera linearis*, and *Lonicera oblongifolia*, some of which are entirely unknown on other bogs of New England and New York, indicates some common feature of these bogs which it will be very enlightening to work out. A somewhat similar association of plants, with a slight variation in the exact species, occurs in some of the marly bogs on the coast of the Gaspé Peninsula, where there is a remarkable mingling of marl-swamp types with the characteristic plants of sphagnum bogs and even of brackish or saline shores. Whether in these marshes there is a rare combination of calcareous, saline, and peat-bog conditions is a matter which awaits further study.

From Crystal we returned to Pembroke, spending our last week there in collecting the fruiting Blackberries and Thorns and in closing off the summer's work. On the way back to Boston we were tempted by the extensive outcrops of limestone in the neighborhood of Rockland to visit that city of lime-quarries with the hope of finding interesting coastal plants. In this, however, we were not wholly satisfied, for the rock seemed very hard and the soil sterile as compared with the softer limestones and limy slates and the extremely fertile soil we had just seen in Aroostook County. Being somewhat disappointed by the comparative sterility of the Rockland region we cast about for something better and decided to spend our last half-day of field-work in

Maine in the neighborhood of Bath, the famous ship-building town. We knew that in West Bath Miss Furbish had a station (one of very few in New England) for *Rosa acicularis* Lindl., var. *Bourgeauiana* Crépin, and that not far from Bath, by Winnegance Creek, was the only station in Maine (also discovered by Miss Furbish) for *Samolus floribundus* HBK.

Arriving at Bath we hired a good horse and genial driver and started for Winnegance. The country was rocky and sandy, with *Rubus villosus* Ait., *Rhus copallina* L., and *Vitis Labrusca* L. indicating very clearly that we were no longer in a boreal region. Upon reaching Winnegance we had only a short time to explore and very soon it was evident that a most superficial survey of the broad tidal marshes along Winnegance Creek would absorb every minute we could give. Here indeed were *Samolus floribundus* HBK., *Lophotocarpus spongiosus* (Engelm.) J. G. Smith and other rare plants of tidal estuaries already collected by Miss Furbish. But we were more excited by the unlooked-for species: great colonies of *Scirpus fluviatilis* (Torr.) Gray, higher than our heads, and heretofore known from Maine only through an unverified report of its occurrence at Perry[1]; *Limosella aquatica* L., var. *tenuifolia* (Wolf) Pers. also on the doubtful list as a Maine plant; *Typha angustifolia* L. and *Cyperus Nuttallii* Eddy, somewhat north-east of their supposed limits; and acres of *Eleocharis rostellata* Torr., a species not previously known in Maine, which tripped us up with its long wiry arching and "tipping" culms; and many other local plants — *Eleocharis olivacea* Torr. &c.— already known from the region. But the greatest prize of the day was a *Bidens* of the tidal flats, which was abundant at and below high-water mark, so that its foliage and heads were disagreeably covered with silt and stranded eel-grass. This was *Bidens hyperborea* Greene, a characteristic halophytic species, formerly known from Hudson Bay and from river-estuaries and salt marshes of the Gaspé Peninsula and recently discussed in Rhodora.[2] This very hurried glimpse at Winnegance Creek and many fleeting glimpses of the coastal region about Bath and eastward and again toward Brunswick indicated that in these tidal estuaries and on the lower reaches of the Androscoggin and the Kennebec and about Merry-meeting Bay is a region of great botanical interest, easily reached and apparently full of surprises for him who will defy the marsh mos-

[1] Goodale, Agric. and Geol. Me. (1861) 128.
[2] Fernald, Rhodora, x. 201–203 (1908).

quitoes and overlook the other discomforts of botanizing in a muddy and oozy district.

The half-day at Winnegance proved a brilliant finish for our outing in Maine, but as we look back over the entire summer, to the Washington County coast, the Aroostook and Meduxnekeag Valleys, and Caribou Bog, we feel that we did well to visit these regions, for besides what is here related we made profitable studies on a score or more of taxonomic problems, some of which are already worked out, others awaiting further study. We also did what we could to verify the accounts formerly given of the vegetation of eastern Maine; and, though "X" seems from his over-enthusiastic language to have been a possible forerunner of the Maine coast land-boomer, his estimate was perhaps no more inaccurate than that of William Oakes. At any rate, if Oakes's condemnation of the State of Maine has not already been proved too sweeping, we feel that the above notes and those which follow in more compact form are evidence that he erred in judgment when, in 1828, he wrote to Robbins that he was "convinced that no great accessions to the N. E. Flora, and of absolutely new plants hardly any, are to be expected from the State of Maine."

(*To be continued.*)

A NEW HYBRID CORNUS (CORNUS RUGOSA × STOLONIFERA).

Alfred Rehder.

In the summer of 1906 a specimen was received at the Arnold Arboretum of a *Cornus* collected by Mr. B. H. Slavin in Seneca Park, Rochester, New York, and accompanied by a note saying that it seemed to be different from *Cornus stolonifera*. A plant sent to the Arboretum in the spring of 1908 flowered and fruited last year, which gave me the opportunity to study also living material. I arrived at the conclusion that this dogwood could hardly be anything else than a

hybrid between *Cornus rugosa*[1] and *C. stolonifera*, as its characters are intermediate between these two species which grow together in the locality where a few individuals of the form in question were found. Also the fact that the pollen of this supposed hybrid contains a large percentage of incompletely developed grains is in favor of the hybrid origin of this plant.

This is the second hybrid observed in the genus *Cornus*; the first being a cross between *Cornus candidissima* Marsh. (*C. paniculata* L'Hérit.) and *C. obliqua* Raf. (*C. Purpusi* Koehne) described by me some years ago as *C. Arnoldiana*.[2] As the second cross is now also in cultivation at the Arboretum and will be propagated and distributed, it seems advisable to bestow on it a binomial designation and it may appropriately bear the name of its discoverer.

Cornus Slavinii (*C. rugosa* × *stolonifera*) n. hybr. Tall shrub of the habit and aspect of *C. stolonifera* but with the stems more strictly upright; young branchlets greenish at first but becoming bright purple toward the end of the year and marked with dark longitudinal specks, remaining purple during the second and third year and furnished with small lenticels. Leaves oval or ovate to broadly ovate, acuminate, generally rounded at the base, 6–12 cm. long and 4 to 7 cm. broad, dark green above and furnished with scattered hairs, glaucous beneath and more or less villous, the hairs of the leaves of the sterile shoots being more appressed, while those of the flowering shoots are more spreading and villous particularly on the veins. Inflorescence mostly hemispherical with opposite slightly distant branches and a distinct central axis, covered with a brownish villous tomentum. Flowers appearing about the middle of June, nearly pure white. Fruits end of July, subglobose or ovoid, pale blue, bluish white or nearly

[1] *Cornus rugosa* Lamarck, Encycl. Méth. II. 115. 1786, cf. also III., p. IV. (*C. circinata* L'Héritier, Cornus, 7, tab. 3. 1788). Though almost universally known as *C. circinata*, the application of the rule of priority makes it necessary to give preference to the name *C. rugosa* Lamarck which for some inexplicable reason seems to have been entirely overlooked until quite recently. The same would apply to *C. racemosa* Lamarck (l. c. 116), which has priority over *C. paniculata* L'Héritier, if *C. candidissima* Marshall (Arb. Am. 35. 1785) is not considered valid on account of its insufficient description.

[2] *Cornus Arnoldiana* Rehder in Sargent, Trees & Shrubs, I. 79, tab. 40. 1903. There can be hardly any doubt that *Cornus Purpusi* Koehne, figured in Trees & Shrubs I. 77, tab. 39, is identical with *Cornus obliqua* Rafinesque (Western Review I. 228. 1819); Rafinesque gives there a detailed description extending over a whole page, while in the place usually quoted (Ann. Nat. 13. 1820) the description is much shorter. I am still of the opinion that *C. obliqua* should be considered a species distinct from *C. Amomum*; its characters being well marked and its geographical range different. Only in New England, where the ranges overlap, do intermediate forms occur.

white, 6–8 mm. high; stone ovoid, oblique, slightly compressed, abruptly pointed at the apex, marked with longitudinal lines and about 5 mm. high, sometimes faintly ribbed.

The hybrid resembles in habit *Cornus stolonifera*, but is more upright; the branches are deep purple as in that species, but marked during the first year with longitudinal short dark lines, but smaller, less numerous and less conspicuous as they are in *C. rugosa*. The leaves resemble in shape those of *C. rugosa*, but are distinctly glaucous beneath; their pubescence is more like *C. stolonifera* in the sterile shoots and more like *C. rugosa* in the flowering shoots, also as regards the pubescence of the upper surface of the leaves which in *C. stolonifera* consists of forked hairs with almost equal appressed arms, while in *C. rugosa* the arms are unequal with the longer arm spreading and wavy or the hairs are simple, particularly on the veins, forming a villous tomentum soft to the touch. On the lower surface the epidermal cells bear papillae with connecting ridges. In *C. stolonifera* and the hybrid these are more closely set around the stomata and form rings, while in *C. rugosa* they are more evenly distributed over the whole surface. The inflorescence resembles more that of *C. stolonifera*, while in *C. rugosa* the ramifications are nearly whorled and a central axis is hardly distinguishable. The color of the flowers is between the pure white of *C. stolonifera* and the creamy white of the *C. rugosa*, and the time of flowering lies between the two. The fruits are usually ovoid as in *C. stolonifera*, but rarely white, mostly more or less bluish; the stone shows the longitudinal lines of *C. stolonifera*, but is less compressed and sometimes faintly ribbed; from *C. rugosa* it differs in being somewhat compressed, higher than broad and distinctly pointed at the apex.

New York: Seneca Park, Rochester, June 9, 1905, August 1, 1905, *B. H. Slavin*; July 15 and 31, 1906, *J. Dunbar*; June 16 and July 25, 1907, *B. H. Slavin*. Maine: Piscataquis Co., valley of the Piscataquis River, gravelly shore, Dover, July 19, 1895, *M. L. Fernald*, No. 305. I have little doubt that the Maine specimen represents the same hybrid, particularly as the two supposed parent species also occur in the locality where it was collected.

The villous pubescence of the under surface of the leaves, though the most obvious and prominent character to distinguish the hybrid from *Cornus stolonifera*, must be used with some caution, for toward the northeastern limit of the range of that species forms occur which also

have the pubescence of the leaves at least partly villous. It is, however, hardly advisable to consider these specimens as representing a distinct variety or form, as the villous character of the pubescence does not seem to be very constant; sometimes the lower leaves of a shoot show a distinctly villous pubescence, while in the upper leaves all the hairs are straight and appressed. In the herbarium of the Arnold Arboretum and in the Gray Herbarium I have noted the following specimens as having the leaves on the under surface at least partly villous. Newfoundland: St. John's, Aug. 1, 1894, *B. L. Robinson & H. Schrenck*, No. 217; Lark Harbour, August 7, 1896, *A. C. Waghorne*; Grand Lake, July 25–Aug. 15, 1906, *Owen Bryant*. Quebec: Roberval, Lake St. John, Aug. 22, 1895, *J. G. Jack*; Little Métis, July 17, 1906, *James Fowler*. Ontario: Kingston, Wolf Island, July 20, 1898, *James Fowler*.

Arnold Arboretum.

TWO NEW SPECIES OF UROMYCES ON CAREX.

Frank D. Kern.

The number of American species of *Uromyces* on *Carex* is apparently small compared with the number of similar species of *Puccinia*. Up to the present time only four such species of *Uromyces* have been described while there are more than four times as many such species of *Puccinia* known. A preliminary study indicates that there occur some *Uromyces* forms which have been previously undetected.

The *Carex* rusts have usually been considered especially difficult to distinguish and for that reason, perhaps, have not been so well studied or collected as the rusts of many other phanerogamic groups. There is a great similarity in the telial stages of these rusts and the failure to recognize properly the species may be the result of placing too much emphasis on the importance of this stage. Recent studies indicate that it is usually possible to find more distinctive morphological characters in the uredinia. Size of the urediniospores, color and thickness of walls, surface markings, and especially the number and arrangement of the germ-pores may all be taken into account.

A specimen of *Uromyces* on *Carex debilis* var. *Rudgei* from Connecticut has recently been studied which is very striking in the germ-pore character in that it has but one pore in a urediniospore. In this regard it is not only different from all other known *Carex* rusts, either *Uromyces* or *Puccinia*, but so far as the writer knows no species of rust (order Uredinales) has ever been observed, previously, with a single pore in the urediniospores. The location of the pore is also unusual being in the lower part of the spore near the hilum, the scar left by the fall of the pedicel. There are also other differentiating characters but on account of the very notable one of a single pore in the urediniospores a name has been selected specially to distinguish it in that regard. It may be characterized as follows:

Uromyces uniporulus n. sp. Urediniis hypophyllis, sparsis, punctiformibus, 0.1–0.3 mm. diam., mox nudis, pulvinatis, dilute castaneis; urediniosporis globosis v. subglobosis, 18–21 × 21–23 μ; episporio obscure cinnamomeo-brunneo, ca. 1.5 μ crasso, rare et distincte echinulato; poro germinationis 1, infra, hilo prope, instructo.

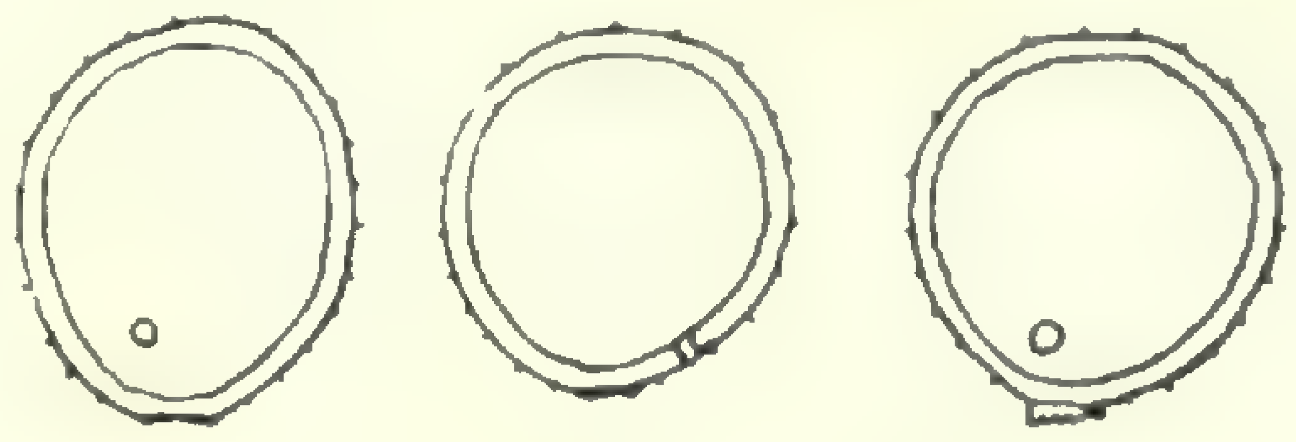

Fig. 1. Three urediniospores of *Uromyces uniporulus* showing the single pore in the lower part of the cell, near the hilum.

Teliis hypophyllis, sparsis, ovatis v. oblongis, 0.2–0.5 mm. longis, mox nudis, pulvinatis, obscure castaneis; teliosporis obovatis, 13–16 × 19–27 μ; episporio cinnamomeo-brunneo, ca. 1 μ crasso, apice incrassato (4–7 μ), levi.

Hab. in foliis *Caricis debilis* var. *Rudgei*, Central Village, Connecticut, Aug. 19, 1908. *John L. Sheldon.*

The studies have also revealed another new species of *Uromyces* on *Carex* which has distinctive germ-pore characters. It has four equatorial pores, an arrangement fairly common in some groups of rusts, but seemingly rare in the *Carex* rusts. None of the other present known species of *Uromyces* on *Carex*, and only one similar species of *Puccinia* has this character. In addition to the microscopical characters this new species is distinctive in the gross appearance of the uredinia and telia. The sori, especially the telia, have an unusually strong development. The following name is here proposed with accompanying description.

Uromyces valens n. sp. Urediniis plerumque hypophyllis, sparsis, ovatis v. oblongis, 0.5–1 mm. longis, epidermide diutius tectis, pulverulentis, cinnamomeis; urediniosporis ellipsoideis, 16–19 × 19–26 μ,

episporio cinnamomeo-brunneo, ca. 1.5–2 μ crasso, distincte echinulato; poris germinationis 4 aequatorialibus instructis.

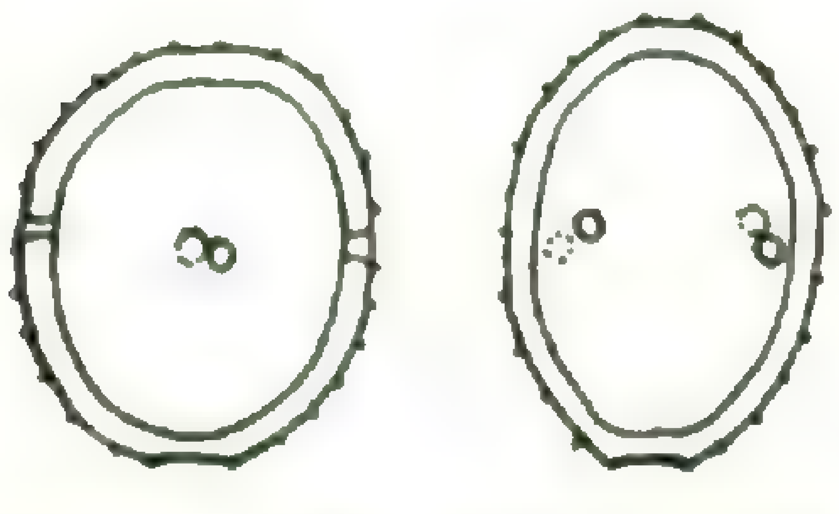

Fig. 2. Two urediniospores of *Uromyces valens* showing the four equatorial pores.

Teliis plerumque hypophyllis, sparsis, oblongis v. linearibus, 0.5–2 mm. longo, epidermide diu tectis, pulvinatis, atro-brunneis; teliosporis obovatis v. oblongo-obovatis, 16–23 × 26–39 μ; episporio casteneo-brunneo, ca. 1.5–2 μ crasso, apice incrassato (7–9 μ), levi.

Hab. in foliis *Caricis urtriculatae*, Mattsville, Indiana, Aug. 8, 1905, *Guy West Wilson, 5130.*

The following key based entirely on uredinial characters will serve to show how the present described American species of *Uromyces* on *Carex* may be identified.

Germ-pores equatorial.
Germ-pores 4, urediniospores medium large, wall cinnamon-brown. *U. valens* Kern
Germ-pores 2 (occasionally 3).
Urediniospores medium large (15–19 × 19–26 μ).
Wall light cinnamon-brown, finely verrucose-echinulate. *U. Solidaginis-caricis* Arth.
Wall golden-brown, coarsely and sparsely echinulate. *U. caricina* E. & E.
Urediniospores small (10–15 × 15–19 μ), wall golden-brown. *U. minutus* Diet.
Germ-pores extra-equatorial.
Germ-pores 2, superequatorial, wall cinnamon-brown. *U. perigynius* Hals.
Germ-pores 1, below, near the hilum, wall dark cinnamon-brown. *U. uniporulus* Kern.

Uromyces Solidaginis-caricis has been reported from Nova Scotia and Maine to Indiana and Wisconsin, and in Colorado. The telial hosts at present known are *Carex deflexa, C. flava, C. gracillima, C. lanuginosa,* and *C. pubescens.* Cultures of this species have been made showing its aecial stage to be on species of *Solidago.* The aecia have been collected in Maine on *Solidago rugosa* and in Indiana on an undetermined *Solidago. U. caricina* is known only on *Carex scoparia* from Delaware and New York. *U. minutus* is a southern species found along the gulf coast from Florida to Texas. *Carex triceps* is the only determined host upon which it has been found. *U. perigynius* is a little known species which has been collected only twice, once in Iowa and once in Wisconsin. Both collections are on *Carex intumescens. U. uniporulus* is known only from the type locality in New England. *Uromyces valens* occurs on *Carex lupulina* in addition

to *C. urticulata* but the range so far as known at present is restricted to central Indiana.

Much culture work needs to be done with the group. Only *U. Solidaginis-caricis* has been culturally connected with its aecial stage. There is no clue concerning the aecial relationship of the new species or of the other three discussed.

PURDUE UNIVERSITY, Lafayette, Indiana.

PLANTS OF EASTERN MASSACHUSETTS FLOWERING IN APRIL, 1910.

The remarkably forward season, especially during early spring when the buds were expanding, has been commented upon very generally and it has seemed to several members of the New England Botanical Club desirable to place upon record a list of such plants of eastern Massachusetts as they have seen in flower or fruit during the month of April. The list is based upon the observations of only a few members, none of whom were often in the field, and as no attempt was made to secure "record" dates it is very certain that others will have notes of even earlier blooming, and probably some species to add to the list. As it stands, the list is a remarkable one for April in the Boston district. The records for April 23 (except for *Uvularia*) were made just north of the Massachusetts line in the town of New Ipswich, New Hampshire, but they are all of plants which extend along the wooded hills into Ashby or Ashburnham and southward. It is hoped that this list, though based on fragmentary records, will be of sufficient interest to call out further notes, that we may have a complete record for future reference of the early flowering species of 1910.

In the following list the dates, unless otherwise explained, are of the earliest flowers noticed, and the records, except for April 23, are all from within 20 miles of Boston. Some species without dates recorded had been seen in flower several times before the record of dates was seriously considered.

Poa annua (Apr. 2).
Eriophorum callitrix (29 or 30, in fruit in small sheltered bog).
Eriophorum gracile (29 or 30, in fruit in wet open meadows).
Carex stricta (30).

Carex umbellata (21, fruit nearly mature).
Carex communis (30).
" varia (30).
" pennsylvanica (before the 17th).
" laxiflora (21).
Arisaema triphyllum (21).
Symplocarpus foetidus (9, and doubtless much earlier).
Luzula saltuensis (23).
" campestris, var. multiflora (21).
Oakesia sessilifolia (17–21).
Uvularia perfoliata (23).
Erythronium americanum (2, few flowers, sunny slope).
Polygonatum biflorum (30, first flowers only).
Trillium erectum (23).
" cernuum (17–23, sunny bank).
Salix fragilis (30).
" alba, var. vitellina (30).
" discolor (fruit, 21).
" humilis.
" rostrata (21).
Populus tremuloides (2).
" grandidentata (21, fruiting).
Myrica asplenifolia (21).
" Gale (17–23).
Corylus americana.
" rostrata.
Ostrya virginiana (21).
Carpinus caroliniana (21).
Betula populifolia (21).
Alnus incana.
" rugosa.
Ulmus campestris.
" americana.
Comandra umbellata (29 or 30, in scrub land).
Stellaria media.
" uliginosa (29 or 30, springy spot in open sheltered pasture — usually 3 weeks later).
Cerastium vulgatum.
Claytonia caroliniana (23).
Ranunculus abortivus (21).
" allegheniensis (young fruit, May 1).
Ranunculus fascicularis (21).
" bulbosus (30).
Thalictrum dioicum (21).
Anemonella thalictroides (17–23).
Hepatica triloba (2).
Anemone quinquefolia (2, few flowers at sheltered border of thicket).
Caltha palustris (2).
Coptis trifolia (before the 17th).
Aquilegia canadensis (21).
Actaea rubra (29 or 30).
Berberis vulgaris (30).
Benzoin aestivale (2, sunny slope).
Sanguinaria canadensis.
Draba verna (fruit, May 2).
Capsella Bursa-pastoris (3).
Barbarea vulgaris (29 or 30).
Saxifraga virginiensis (9).
Chrysosplenium americanum (2).
Ribes oxyacanthoides (23).
" prostratum (23).
Amelanchier canadensis (before the 17th, on sunny hillside).
Amelanchier oblongifolia (21).
" " var. micropetala (in full bloom, May 1).
Fragaria virginiana (21).
Potentilla pumila (2).
" canadensis, var. simplex (30).
Rubus triflorus (30).
Prunus spinosa (19).
" pennsylvanica (17–23).
" cuneata (29 or 30, esker-slopes, not specially protected).
Prunus avium (21).
" nigra (23).
Geranium maculatum (29 or 30, open sunny woods, 1 flower only).
Acer saccharum (23).
" rubum (9).
Viola pedata, var. lineariloba (13).
" cucullata (21).
" papilionacea (before the 17th).

Viola sororia (21).
" septentrionalis (21).
" fimbriatula (before the 17th).
" sagittata (21).
" lanceolata (30).
" pallens (9).
" rotundifolia (passing, 23).
" scabriuscula (21).
" conspersa (19, with some flowers faded, sheltered meadow at edge of woods).
Panax trifolia (23).
Cornus florida (in full bloom, May 1).
Rhododendron canadense (30).
Andromeda glaucophylla (29 or 30).
Chamaedaphne calyculata (9, in a warm open meadow).
Epigaea repens (23, flowers fading).
Arctostaphylos Uva-Ursi (13, sunny hill-top).
Vaccinium pennsylvanicum (21).
" corymbosum (29 or 30).
Vaccinium atrococcum (21).
Phlox subulata (30).
Trientalis americana (29 or 30).
Myosotis virginica (17–23).
Veronica serpyllifolia (17–23).
" arvensis (17–23).
Houstonia caerulea (2).
Lonicera caerulea, var. villosa (24).
" canadensis (23).
Viburnum alnifolium (23).
Antennaria Parlinii (29 or 30, sunny brook-bank).
Antennaria canadensis (21).
" plantaginifolia (21).
" neodioica (21).
" neglecta (17).
Tussilago Farfara (2).
Petasites vulgaris (2).
Taraxacum officinale (15).
" " var. palustre (21).
" erythrospermum (21).

SOME FACTS RELATING TO SILENE ANTIRRHINA.

Walter Deane.

While studying recently some specimens of the Sleepy Catchfly, *Silene antirrhina* L., from Oak Island, Revere, Massachusetts, collected by Mr. C. F. Batchelder on June 11, 1909, I was struck by the fact that of the twelve plants examined five had the joints of the stems entirely free from the glutinous bands that I had always supposed were present, while all the plants were scabrous or pubescent at the base. A reference to the 7th edition of Gray's Manual showed that the species comes under the section, "Glabrous, a portion of each joint of the stem glutinous." This started me to examine the specimens of the species that were readily available. Besides those in my own herbarium and the herbaria of Dr. G. G. Kennedy and Judge J. R. Churchill, I studied those in the Gray Herbarium, including 56 sheets of this species, and those in the herbarium of the New

England Botanical Club, 17 sheets of *Silene antirrhina* being there. The results were interesting. About 100 sheets, embracing at least from 200 to 300 specimens were examined. Every plant was scabrous or pubescent at the base, with the exception of one from Texas, collected by F. Lindheimer in 1843 and marked in Dr. Asa Gray's handwriting, "var. laevigata." This is described in Plantae Lindheimerianae, Part I, 217 (1845), by George Engelmann and Asa Gray as follows, "21 [Silene antirrhina] var. laevigata; the leaves smooth, and with smooth margins — Galveston." It is to be noticed that an examination showed that not only the leaves but the entire plant is glabrous.

None of the specimens had glutinous bands on any of the lower internodes while twenty-nine plants had none at all. I suspected at first that these bands might be absent in the earlier stages in the life of the plant, but might appear later in the season. This, however, was disproved by the fact that of the twenty-nine plants mentioned above eight only were in flower while twenty-one were in fruit. The glutinous bands, accordingly, were absent through the life of these plants and doubtless this is true of all others that show at any time a lack of these bands. I will say here that in making these observations I used a strong pocket lens, as being all that is required for systematic work of this kind.

An examination of a number of Manuals in which this species is described shows that the points above mentioned are all well characterized only in Torrey and Gray's Flora of North America, i. pt. 2, 191 (1838) as follows, "Stem. . . . puberulent or scabrous at the base, a portion of the upper internodes usually viscid." I noticed also that occasionally the plants were slightly pubescent above and that the leaves were always ciliate at the base. This last fact is mentioned in some of the Manuals. In the above details the species might be characterized as follows: — Scabrous to pubescent at the base, upper portion generally glabrous, sometimes slightly pubescent, leaves ciliate at base; a portion of one or more of the upper internodes generally, but not always, glutinous.

It is interesting to note how variously the plant has been described as regards the special points noticed above. One statement or another is wrong, and the effect of this is often far-reaching and hard to eliminate. I will cite a few cases: Bigelow's Florula Bostoniensis, ed. 2, 183 (1824) and ed. 3, 194 (1840), "Stem smooth. . . . Leaves. . . . sub-

ciliate at base."; Darlington's Flora Cestrica, 273 (1837), "Stem .... smoothish....a portion of the internodes of the stem and branches at length coated with a dark purple viscid matter."; Gray's Manual, ed. 1, 59 (1848), "Nearly smooth....some of the upper joints viscid.", ed. 4, 56 (1866), "Glabrous throughout; a portion of each joint of the stem mostly glutinous."; Wood's Class-Book of Botany, 256 (1877), "Nearly smooth....A few of the upper internodes are viscidly pubescent above their middle."; Chapman's Flora of the Southern United States, 52 (1884), "smoothish, clammy below the upper joints."; Britton and Brown's Illustrated Flora of the United States and Canada, ii. 11 (1897) and Britton's Manual of the Flora of the Northern States and Canada, 390 (1901), "puberulent or glabrous, glutinous about the nodes." These are a few instances in many that I examined where the facts relating to the pubescence and glutinous character are either not adequately gi en or are stated without proper qualifications.

Cambridge, Massachusetts.

Flowering Plants and Ferns of Connecticut.— In January, 1903, the numerous botanical workers in Connecticut became organized as the Connecticut Botanical Society. Since that date the Society has maintained an enthusiasm and a standard of investigation and productiveness which it is inspiring to witness. During its short career the Society has issued, as Bulletins of the State Geological and Natural History Survey, Professor White's *Hymeniales of Connecticut*, Dr. Clinton's *Ustilagineae, or Smuts, of Connecticut*, Conn and Webster's *Algae of the Fresh Waters of Connecticut*, Evans and Nichols's *Bryophytes of Connecticut*; and now we have the Catalogue of the Flowering Plants and Ferns of Connecticut.[1]

The State and the Society as well as botanists throughout the country are particularly to be congratulated upon the efficient group of men to whom the work was entrusted, for it would be difficult to find in any community a committee of six men who combine so admirably scholarly ideals and attainments with intimate field knowledge of the flora. It is interesting to note that all the members of the committee are amateurs to whom the work has been strictly a labor of love.

The Catalogue consists of 569 pages, the first 16 occupied by introductory matter of much interest, the last 105 by an exhaustive index.

[1] Catalogue of the Flowering Plants and Ferns of Connecticut growing without Cultivation. By C. B. Graves, E. H. Eames, C. H. Bissell, L. Andrews, E. B. Harger, and C. A. Weatherby, Committee of the Connecticut Botanical Society. Hartford, 1910 (Bulletin no. 14, Connecticut Geological and Natural History Survey.)

In the Catalogue proper a liberal interpretation has been adopted and every species which has shown a tendency to care for itself or to spring up spontaneously has been included. Many of these, of course, are merely fugitives which have not been counted in the summary of Connecticut species. Excluding the 169 fugitives, the Catalogue enumerates 2,228 vascular plants, giving under each a careful summary of all that is known of its occurrence in the state, its habitats, relative abundance in different sections, flowering and fruiting seasons, colloquial names, and items of economic or biological interest. A novel feature in such a work is the introduction in parentheses after the Latin name of a translation of the specific epithet, a feature which will do much to assist those whose Latin is rusty or wanting. The nomenclature of the 7th edition of Gray's Manual is followed and synonyms are inserted freely. It is a pleasure to note that the quasi-colloquial names which have been much in vogue in some English and American Floras are omitted and that an effort has been made to include only such as are actually in use or of folk-origin. Thus, the *Carices*, which to most untechnical people are "grasses" or at best merely sedges, are not encumbered with book-names, *Carex stricta* alone in the genus being distinguished by colloquial names: "Sword Grass" and "Niggerheads." *Corallorrhiza odontorhiza* is distinguished from the other members of the genus as "Crawley Root," "Dragon's Claws" and "Chicken-toes." Other items might be discussed in detail, but the book will speak for itself to all who are interested in it. The present writer may say, however, that the Catalogue seems to him to be all that had been hoped for — a well digested and painstaking record of our present knowledge of the occurrence of the Flowering Plants and Ferns of Connecticut, prepared by a committee whose personnel is a guarantee that everything in it may be relied upon. The State is following a liberal policy in gratuitously distributing its bulletins (postage on No. 14 fifteen cents) to public libraries, colleges, scientific men, and others who specially need them in their work, especially if they are citizens of Connecticut. To others the charge for the present Bulletin is seventy-five cents, postpaid. Applications should be sent to George S. Godard, *State Librarian*, Hartford, Conn. — M. L. F.

Vol. 12, no. 137, including pages 81 to 100, was issued 27 May, 1910.

Rhodora

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A SUMMER'S BOTANIZING IN EASTERN MAINE AND WESTERN NEW BRUNSWICK.

M. L. Fernald and K. M. Wiegand.

Part II. Technical Notes on Some of the Plants collected.

(Plate 84.)

Lycopodium annotinum L., var. pungens Desv. In dryish heath, Boot Cove, Lubec. Collected also by Kennedy, Williams, Collins, and Fernald at Cutler in 1902 and by Cushman on Great Wass Island in 1907 (Rhodora, xi. 13).

Lycopodium sabinaefolium Willd. Border of dry woods Ingleside, Westfield, N. B. Previously known from the upper St. John.

Potamogeton Vaseyi Robbins. Cove in the St. John River near Ingleside Station, Westfield, New Brunswick. The first station, apparently, east of the Penobscot River.

Panicum tennesseense Ashe. Common in gravel along the Aroostook River, extending to its mouth in New Brunswick; also collected in a clearing in Westfield, N. B., on the lower St. John. Previously unknown in New Brunswick.

Setaria viridis (L.) Beauv., var. Weinmanni (R. & S.) Brand in Koch, Syn. ed. 3, 2690 (1905). A plant differing from the common *S. viridis* in its depressed or spreading habit, narrower leaves (2–6 mm. wide) and slender spikes (excluding the bristles 3–6 mm. thick) is common on railway gravels and by roadsides in various parts of eastern and northern Maine, in New Brunswick and Quebec, and is found locally in Massachusetts. It occurs in such habitats about

the towns of the Lower St. Lawrence, in northern Aroostook Co., Maine, and Madawaska Co., New Brunswick; and the past summer was found by the writers along the Canadian Pacific Railway at Ft. Fairfield, Maine, and at Aroostook Junction, New Brunswick, also on the Washington County Railroad at Pembroke, Maine; and recently it has been collected by Messrs. Walter Deane and Edward L. Rand in dry soil in Swansea, Massachusetts. In the 7th edition of Gray's Manual a somewhat similar plant was included by Hitchcock under var. *breviseta* (Döll.) Hitchc., based upon Döll's *Panicum viride β brevisetum* with "Aehrchen kaum ein wenig von den Hüllborsten überragt."[1] The latter plant, true var. *brevisetum*, was collected in 1884 by Dr. C. W. Swan on dumps at Lowell, Mass., Dr. Swan's material having the bristles only 3–4 mm. long, i. e. scarcely or only slightly exceeding the spikelets, and a similar plant occurs about Boundary Lake in northern Maine and adjacent Quebec. The commoner slender-spiked and narrow-leaved depressed plant of eastern and northern Maine and eastern Canada, however, has its bristles (4–6 mm. long) conspicuously longer than the spikelets and is very satisfactorily matched by material distributed by Degen & Flatt in the *Gramina Hungarica* (No. 4) as *Setaria viridis*, var. *Weinmanni*. It is noteworthy that in the American material as well as in the Hungarian specimens the purplish color of the bristles (a character emphasized by recent European authors) is developed only in a few of the most mature spikes. Roemer & Schultes[2] in their original description of the plant as *Setaria Weinmanni* do not mention the color of the bristles but state that their plant is intermediate between *S. glauca* and *S. viridis*, though Koch[3] in his Synopsis treats it as a small purplish form of *S. viridis*: "minor saepe colore sordide purpureo suffusa," and many subsequent authors have emphasized the purple bristles. From a study of the material at hand, however, it would seem that the purple color is a less significant character of the plant than its habit, narrow leaves, and slender spikes.

Zizania aquatica L. This narrow-leaved plant abounds in the lower waters of the Nerepis River at Westfield, New Brunswick. Although formerly reported from New Brunswick a new record is desirable in view of the recent re-segregation of *Zizania*.

[1] Döll, Fl. Baden, i. 234 (1857).
[2] R. & S. Syst. ii. 490 (1817).
[3] Koch, Syn. 773 (1835–37).

Alopecurus geniculatus L. In a roadside ditch, Pembroke, Maine. Well known from about Portland, but otherwise unrecorded from the State.

Glyceria laxa Scribn. is abundant in eastern Washington County, Maine, and was collected in Westfield, N. B. It was ordinarily easy to distinguish it from *G. canadensis*, but the number of flowers (the key-character used in the 7th edition of Gray's Manual) proved to be inconstant. In well-developed *G. canadensis* the spikelet is broader and more turgid than in *G. laxa*, but the most marked difference seems to be in the panicles. In the panicle of *G. canadensis* there are 1–3 primary branches at a node, and the panicles are only 2–3 times branched; in *G. laxa* there are ordinarily 3–5 primary branches at the middle nodes, and the panicles are 3–4 times branched.

Bromus altissimus Pursh is the common representative of the group along the St. John and Aroostook Rivers, and herbarium material shows it to occur in many of the river-valleys of the Gaspé Peninsula in Quebec.

Eleocharis rostellata Torr. Abundant on salt marshes along Winnegance Creek, Phippsburg, Maine. Not previously reported from the state.

Scirpus fluviatilis (Torr.) Gray is abundant in the dead water at the mouth of the Nerepis River and below it in the St. John in Westfield, N. B. It had formerly been reported from Perry, Maine, though no specimens from that station can now be found. It is abundant, however, on tidal flats of Winnegance Creek, Phippsburg, Maine, and should be looked for at the estuaries of other tidal streams of the Maine Coast.

Carex scoparia Schkuhr, var. **tessellata** n. var., humilis 2–4.5 dm. alta; inflorescentiis ovoideis 1.5–2.3 cm. longis; spicis 3–6 confertis ellipsoideo-ovoideis 6–10 mm. longis; squamis brunneis; perigyniis late ellipticis 2 mm. latis quam squama valde latioribus.

Low, 2–4.5 dm. high; inflorescence ovoid, 1.5–2.3 cm. long; spikes 3–6, mostly crowded, ellipsoid-ovoid, 6–10 mm. long; scales brown; body of the perigynia broadly elliptical, 2 mm. wide, conspicuously broader than the subtending scale.— Maine: damp low ground, Marshfield, July 8, 1902 (*Fernald*); dry low ground, Pembroke, July 8, 1909 (*Fernald & Wiegand, Fernald* no. 1464). This is a peculiar short-headed plant obviously related to *C. scoparia*, but with much broader perigynia which, being wider than the dark subtending scales,

give the spikes a checkered or mottled appearance. It is as yet known only from Washington County, Maine.

Carex arcta Boott. Alluvial woods along the Nerepis River, Westfield, New Brunswick. Not previously recorded from New Brunswick, though known from the upper St. John in Maine.

× Carex helvola Blytt (*C. canescens* × *norvegica*). Plants which were apparently a hybrid of *Carex canescens* and *C. norvegica* were found in a brackish marsh on the east side of Moose Island in Passamaquoddy Bay, and later a similar colony was found in a fresh-water swamp at Pembroke, Me. The specimens are mostly infertile and compare well with Scandinavian material except that the spikes are more remote, a trait traceable to our *C. canescens*, var. *disjuncta* which is more abundant than the typical form in eastern Maine.

Carex maritima O. F. Müller, var. erectiuscula Fernald, Rhodora ii. 170 (1900), known before only from Cushing, Maine, was found in some abundance in a meadow at Pembroke, Maine. The Pembroke plant is much larger than the original Cushing material, the pistillate spikes being 3.5–7.5 cm. long.

Carex aquatilis Wahlenb., var. cuspidata Laestad. was collected in wet meadows four or five miles apart in Pembroke. Though known from the lower St. Lawrence in Quebec, from Nova Scotia, and from northern New Jersey, this variety has not been reported, apparently, from New England. It resembles forms of *C. salina*, but is strongly glaucous.

Carex vaginata Tausch, formerly known in Maine only from the Arbor Vitae swamps of Aroostook County, was found in a small open meadow-like spot in a thicket between Julia's Cove and Boot Cove, Lubec, Maine. In eastern Quebec and northern Maine it ordinarily grows in a carpet of *Hypnum*, but at the Lubec station its roots were in *Sphagnum*.

Carex pennsylvanica Lam., var. lucorum (Willd.) Fernald, abounds on the sunny slope of an esker near the village of Pembroke, Maine, thus extending the known range considerably east of the former supposed limits, on Mt. Desert Island and in the Penobscot Valley.

Carex flava L., var. gaspensis Fernald, Rhodora viii. 200 (1906) was found in profusion along the Meduxnekeag River, in springy places in thickets below Houlton. This variety, with slender subulate perigynia, has previously been known only from river-banks and marl-bogs north of the Baie des Chaleurs.

JUNCUS DICHOTOMUS Ell., var. PLATYPHYLLUS Wiegand, reported in RHODORA xi. 42, from southern Maine (i. e. upon specimens collected at Wells by Miss Furbish) was found on sand at Falmouth, Me., and later in abundance on the edge of a ditch in a boggy swamp at Pembroke, Me., thus extending its range eastward along the coast nearly to the New Brunswick border.

JUNCUS VASEYI Engelm., formerly known in New England only from the Upper St. John Valley, Orono and Clifton in the Penobscot Valley, and the region of Rangeley Lakes, was found forming a few broad stools at the border of a ditch in a boggy meadow near Ayer's Junction, Pembroke.

JUNCUS **articulatus** × **brevicaudatus**. A colony of plants found in a wet mossy spot on the Charlotte Road, Pembroke, Maine, was infertile and in its inflorescence combined the characteristics of these two common species, some of the inflorescences having 2–4-flowered glomerules, others having them many-flowered.

HABENARIA FIMBRIATA (Ait.) R. Br. On the meadows along Hamilton Brook, Lubec, Maine, this species is abundant and there exhibits a remarkable range of variation in the form of the lip. A series of specimens was collected showing the middle lobe of the lip varying in every conceivable degree from broadly fan-shaped with conspicuously fimbriate margin to cuneate-oblanceolate with barely erose tips. No other species of *Habenaria* was observed in the region.

SALIX PETIOLARIS Sm., var. ANGUSTIFOLIA Anders. This variety, which is usually a low shrub with tufted branchlets and comparatively short narrow entire or sub-entire leaves, is more common in eastern and northern Maine than the typical form of the species which has the mature leaves (7–12 cm. long) conspicuously toothed. Forms of the variety with either glabrate or permanently sericeous leaves are common.

SALIX SMITHIANA Willd. is a common tree willow of roadsides, hedgerows, etc. in southeastern Washington County, Maine (noted in the towns of Eastport, Lubec, and Pembroke). It has spread freely and is now thoroughly established in some places in swampy thickets where it is seen growing among native species.

COMANDRA LIVIDA Richardson. On the heath at the base of West Quoddy Head, Lubec, Maine. All the plants examined were sterile, as were those found at Roque Bluffs by Mr. C. H. Knowlton (see RHODORA ix. 219).

Rumex Patientia L. Throughout the southeastern section of Washington County this is the abundant *Rumex* of all open situations which are not too dry, growing freely in fields, meadows, thickets, and along roadsides. It is fully mature and dull brown in color early in August, when the less common *R. Britannica* is beginning to flower.

Montia fontana.[1] We have in North America three clearly defined species which have generally passed as *Montia fontana*. These may be briefly described as follows:—

A. Seeds dull (except under a lens), conspicuously and closely muricate with bluntish or acutish tubercles: a yellowish green annual with flowers both lateral and terminal, the latter in 3–8-flowered cymes.
1. *M. fontana* L.

B. Seeds lustrous, the tubercles obscure or short and flattened.
A deep green perennial, the branches rooting at the nodes: flowers chiefly in 3–8-flowered lateral cymes, the branches usually terminated by a tuft of leaves; seeds about 1 mm. long, very plump, slightly lustrous.
2. *M. rivularis* Gmel.

Yellowish-green annual, the simple or slightly forking stems not rooting at the nodes: flowers solitary or in pairs from the nodes and tips of the stems and branches: seeds 1–1.6 mm. long, lenticular, highly lustrous . . . . 3. *M. lamprosperma* Cham.

1. M. fontana L. Sp. i. 87 (1753), in part. *M. minor* Gmel. Fl. Bad. i. 301 (1805). Upper leaves oblong to oblanceolate and sessile: the terminal cymes sessile or short-stalked: mature capsules 2–2.5 mm. in diameter: seeds 1–1.3 mm. long.— Eurasia, Oregon and California. Plate 84 (a).

Var. **tenerrima** (Gray) n. comb. *Claytonia Chamissonis* Eschsch., var. *tenerrima* Gray, Proc. Am. Acad. viii. 378 (1872). *C. Hallii* Gray, Proc. Am. Acad. xxii. 283 (1887). *Montia Hallii* Greene, Fl. Franciscana, 180 (1891), as to synonym. Very slender: leaves mostly broad-spatulate and petioled: cymes often long-stalked: mature capsules 1–2 mm. broad: seeds barely 1 mm. long.— British Columbia to California.

2. M. rivularis Gmel. Fl. Bad. i. 302 (1805).— Europe. Newfoundland: ditches, Holyrood, August 28, 1894, *Robinson & Schrenk*, no. 48. Plate 84 (b).

3. M. lamprosperma Cham. Linnaea, vi. 565 (1831).— Arctic and boreal Europe; northeastern Asia; Alaska; Greenland to eastern Maine. The following specimens from eastern America have been examined. Labrador: Nain, *Lundberg*; Hopedale,

[1] For the plate which shows very clearly the habitat and seed-characters of the segregates of *Montia fontana* we are indebted to the generosity of Mr. F. Schuyler Mathews.

August, 1897, *J. D. Sornborger*, no. 193. NEWFOUNDLAND: Barred Islands, August 20, 1903, *J. D. Sornborger*. QUEBEC: springy places and wet pastures, Ste. Anne des Monts, July 12, 13, 1881, *J. A. Allen;* springy bank, Bic, July 26, 1907, *Fernald & Collins*, no. 1017; brackish shores, Dartmouth River, August, 1904, *Collins, Fernald & Pease*; damp mossy ground, Pointe Nouvelle, Hope, July 30, 1902, *Williams & Fernald*; muddy margins of creeks, Bonaventure River, August, 1904, *Collins, Fernald & Pease*. NEW BRUNSWICK: Shediac, *J. Fowler*, 1883. NOVA SCOTIA: wet meadow, Northwest Arm, Halifax, June 19, 1883, *J. Macoun*. MAINE: in a spring rill, Little River Island, Cutler, July 5, 1902, *Kennedy, Williams, Collins & Fernald*; Great Cranberry Isle, July 5, 1893, *E. L. Rand*; South Duck I., July 17, 1893, *J. H. Redfield*. PLATE 84 (c).

RANUNCULUS DELPHINIFOLIUS Torr., formerly unknown east of the lower Penobscot, was found carpeting the bottom of a muddy pool in Princeton on the St. Croix River.

RANUNCULUS PURSHII Richardson abounds in a shallow spring-hole in an Arbor Vitae swamp by the Meduxnekeag River in New Limerick, Aroostook County, Maine. This station, the first in New England, agrees in its obvious characteristics — a shallow pool and its adjacent muddy shores in an Arbor Vitae swamp — with the stations already known for this local species in the Gaspé Peninsula.

BRASSICA ALBA (L.) Boiss. About Eastport this is the common mustard of roadsides, railroad banks, waste places, etc., and it was found extending locally along the Washington County Railroad as far as Ayer's Junction in Pembroke. Nowhere else have we ever met it except as a casual plant of garden refuse and similar habitats.

AMELANCHIER CANADENSIS (L.) Medic., var. TOMENTULA Sarg. (see RHODORA, xi. 47) occurs locally in rocky woods at Pembroke, Maine. It has formerly been known in Maine only from the southwestern section.

CRATAEGUS COLUMBIANA Howell, var. BRUNETIANA (Sarg.) Egglest. was frequent about Pembroke, Maine, and specimens in the herbarium of the New England Botanical Club also identified by Mr. Eggleston show it to extend southward along the coast to Brunswick (*Miss Furbish*).

CRATAEGUS JONESAE Sarg. This is one of the most characteristic species of the coastal region of Maine, seen at various points from Pembroke to Portland Harbor. A sheet in the herbarium of the New England Botanical Club, collected by Miss Furbish at Skowhegan, shows it to extend inland to the central portion of the state.

Potentilla palustris (L.) Scop., var. villosa (Pers.) Lehm. This handsome variety, noted in Rhodora, xi. 48 from the Gulf of St. Lawrence, is the common form of the species in eastern Washington County, Maine, where it occurs in either fresh or brackish water.

Potentilla palustris (L.) Scop., var. subsericea Becker, Deutsch. Bot. Monatsschr. xv. 85 (1897), which has the leaves silky but lacks the dense glandular pubescence on the peduncles, petioles, etc., was found on the meadows of the Nerepis River at Westfield, N. B., the first station known to us in America.

Agrimonia gryposepala Wallr. occurs in the alluvium of the Nerepis River, Westfield, N. B., and along the Aroostook River, Ft. Fairfield, Maine, thus extending its recorded range slightly northeastward.

Vicia angustifolia Reichard, var. uncinata (Desv.) Rouy & Foucaud. This variety with very narrow elongate-linear and truncate mucronulate leaflets formed depressed mats on the strand at Pleasant Point, Perry, Maine. Similar specimens were collected by Judge J. R. Churchill near Tracadie Beach, Prince Edward Island, in 1901. These are the only American collections of the variety seen by the writers.

Euphorbia serypllifolia Pers. Two forms of this species, one with green leaves, the other with leaves blotched with crimson, abound in the yard of the Canadian Pacific Railway at Aroostook Junction, Andover, N. B., where they are accompanied by the ordinarily more common *E. maculata* L. and *E. hirsuta* (Torr.) Wiegand.

Euphorbia glyptosperma Engelm. Abundant in the yard of the Canadian Pacific Railway at Hartland, New Brunswick, and in less abundance along the railway at Fort Fairfield, Maine.

Acer rubrum L., var. tridens Wood. A large tree with peculiarly depressed wide-spreading top was called to our attention by Dr. G. U. Hay near his camp at Ingleside Station, Westfield, New Brunswick. This proved to have the characteristic foliage of the var. *tridens*, a variety previously unknown north of Auburndale, Massachusetts, its only known New England station (see Rehder, Rhodora ix. 116).

Rhamnus alnifolia L'Her. occurs locally in a rich swamp on the Charlotte Road, Pembroke, Maine, near a calcareous outcrop. It was also seen in meadows of the St. Croix River below Princeton.

Malva sylvestris L., var. mauretiana (L.) Boiss., which differs from the typical hirsute *M. sylvestris* with sharply angulate-lobed

leaves in being glabrous or glabrescent, in having the leaves more obtusely lobed, and in its deeper colored flowers, was found in waste ground about the site of an old fire at Pembroke, Maine. The only New England material of *M. sylvestris* seen by us — from Rumford, Maine (*Parlin*), Charlotte, Vt. (*Faxon*), and Charlestown, Mass. (*Perkins*) — is of this variety.

Œnothera cruciata Nutt. Open sandy roadside near Round Pond, Charlotte, Maine. Previously unrecorded east of the Penobscot Valley.

Œnothera fruticosa L., var. hirsuta Nutt. Abundant in dry open soil in an old field, Pembroke, Maine; the first station recorded in Maine east of the Penobscot Valley, where it occurs in open woods on the dry slopes of an esker in Alton.

Vaccinium pennsylvanicum Lam., var. angustifolium (Ait.) Gray. Very characteristic shrubs of this usually northern or alpine variety were found on the heath at the base of West Quoddy Head, Lubec, Maine. It had been found in 1902, but unrecorded, by a party from the New England Botanical Club at Cutler, Maine.

Lysimachia **terrestris × thyrsiflora**. In the boggy meadow along the St. Croix River between Milltown and St. Croix Junction, Calais, Maine, occurs a *Lysimachia* which in appearance is intermediate between *L. terrestris* and *L. thyrsiflora*, and which we consider a hybrid between these species. In the foliage and density of the raceme the plant is like *L. thyrsiflora*, but the racemes are long and mostly terminal as in *L. terrestris*, though only one plant in hundreds produced inflorescences in 1909. A similar plant was collected with *L. terrestris* by Pres. Ezra Brainerd at Middlebury, Vermont, June 22, 1880.

Fraxinus pennsylvanica Marsh. occurs along the St. John River at Westfield, New Brunswick. It is also found at Fort Kent in northern Maine and therefore presumably throughout the St. John Valley.

Galeopsis Tetrahit L., var. bifida (Boenn.) Lejeune & Courtoir. Two forms of *G. Tetrahit*, quite distinct in appearance, were seen in Washington County; one with large white flowers was found in only one locality near the Eastport Railroad Station, but the other with smaller purplish flowers was much more widely distributed. A study of herbarium material and of European handbooks shows that one of these forms is a well-marked variety of the other, and is so recognized in Europe. *G. Tetrahit* in America may therefore be treated as follows:—

G. Tetrahit L. (typical) Calyx-teeth in fruit 7.5–11 mm. long: corolla large, about 2 cm. long, with broad lower lip; the middle lobe rarely longer than broad, usually rounded, rarely emarginate, the margins flat; the nipples at the base of the lip large: leaves mostly rounded at the base: flowers (in this country) commonly white, often partly suffused with purple, rarely entirely purple.— Apparently much less common in America than the variety, and mostly confined to the north-eastern country. Specimens seen by us:— Quebec: Grand River, Gaspé County, August 15, 1904, *Collins, Fernald & Pease.* Newfoundland: damp meadow near Topsail, Conception Bay, August 12–19, 1901, *Howe & Lang*, no. 1262; moist place in meadow, Torbary, August 21–26, 1901, *Howe & Lang*, no. 1400. Maine: railroad bank, Eastport, August 16, 1909, *Fernald & Wiegand*; Middle Dam, Rangeley Lakes, August 2, 1903, *B. L. Robinson*: in grain fields, Buckfield, September 3, 1897, *J. C. Parlin*, no. 901. New Hampshire: Jefferson, September 14–21, 1873, *Wm. Boott*; East Andover, August, 1903, *M. A. Day*; roadside, Troy, September 11, 1897, *B. L. Robinson*, no. 365. Massachusetts: low ground, Gloucester, August 15, 1897, *W. P. Rich.* Ontario: vicinity of Belleville, July 27, 1876, *J. Macoun*, no. 1342.

G. Tetrahit L., var. bifida (Boenn.) Lejeune & Courtoir, Compend. Fl. Belg. ii. 241 (1831). *G. bifida* Boenn. Prodrom. Fl. Monast. 178 (1824). Calyx-teeth in fruit 5–8 mm. long: corolla shorter (about 14–16 mm. long) and much more slender than in the species, with smaller lower lip; the middle lobe oblong, more or less emarginate, the margins often revolute; nipples at base of lip smaller and narrower: leaves cuneate at base: color of flowers purplish, very rarely white.— The common form especially in southern New England and southward and westward.

Stachys tenuifolia Willd., var. aspera (Michx.) Fernald. A large clump of luxuriant plants was found by a small pond near the tracks of the Grand Trunk Railway, Portland, Maine; apparently the only station in the state.

Elsholtzia Patrini (Lepechin) Garcke. This fragrant plant which has been known as an established weed about Lake Temiscouata, Quebec since 1887, was found in abundance along the Bangor and Aroostook Railroad at New Limerick, Maine. Its appearance at New Limerick, more than one hundred miles south of Lake Temiscouata, indicates that it may be watched for with confidence along the intermediate traffic-lines of northern Maine and New Brunswick.

Linaria minor (L.) Desf. occurs in great abundance about the yard of the Canadian Pacific Railway at Fairville, New Brunswick. It

was noted in Fowler's Catalogue as collected on a ballast wharf at St. John in 1881.

Limosella aquatica L., var. tenuifolia (Wolf) Pers., which has long been on the unverified list as a Maine plant, occurs in brackish mud with *Lophotocarpus spongiosus*, *Samolus floribundus*, etc. along Winnegance Creek, Phippsburg, Maine. *Limosella* was reported by Goodale from Scarboro in 1862 (Proc. Portland Soc. Nat. Hist., i. pt. 1, 57) but no specimens from that station are extant.

Euphrasia Randii Robinson, var. Farlowii Robinson. At the type locality (Dog Island, near Eastport, Maine) and near the light house at the tip of West Quoddy Head, Lubec, this plant seemed to be specifically distinct from the commoner *E. Randii*. The latter plant had larger smoother leaves, and the crimson corollas were yellow or yellowish-green in the throat; while in the var. *Farlowii*, with smaller and thicker densely hirtellous leaves, the more crowded flowers had the white corollas striped with purple, but without the yellow throat. Upon studying a large series of specimens, however, from Newfoundland, Quebec, Nova Scotia, and Maine, these characters were all found to vary to such an extent that they seem at best only varietal.

Euphrasia americana Wettst. is ordinarily a coastal species but it was found in sterile soils as far up the St. Croix Valley as we explored, at Princeton, Maine, and later in New Limerick in southern Aroostook County, Maine. This latter station and one on slaty open soil at Oldtown, Maine, are exceptionally far inland.

Rhinanthus Crista-Galli L. The common American plant treated as *R. Crista-Galli* in the 7th edition of Gray's Manual has the stems (in living plants at least) black-lineolate, and the teeth of the upper lip of the corolla bluish or violet. This form of the species is recognized by European students of the genus as a well-marked variety, var. fallax (Wimmer & Grab.) Druce, Fl. Berks. 384 (1897) based upon *Alectorolophus minor, β fallax* Wimmer & Grab. Fl. Siles i. pt. 2, 213 (1829). It has by some recent authors been known as *Alectorolophus minor*, var. *vittulatus* Gremli, Excursionsf. für die Schweiz ed. 4, 320 (1881). True *R. Crista-Galli*, as interpreted by recent European authors, lacks the black striations on the stem and the violet coloring in the upper lip. This plant was collected on Great Diamond Island in Portland Harbor by Messrs. Bissell and Wiegand, July 5th, and should be watched for elsewhere on our coast. From *R.*

oblongifolius Fernald the typical *R. Crista-Galli* is readily distinguished by its numerous branches (in all but stunted or undeveloped plants), its lance-attenuate leaves, and the strong tendency to blacken in drying.

Galium labradoricum Wiegand, hitherto known in Maine only from the northern half of the state, was found in a sphagnous marsh near the edge of a salt marsh on the east side of Moose Island in Passamaquoddy Bay, Maine.

Galium boreale L. A number of fine plants were found at the edge of a boggy meadow in Pembroke, Maine.

Aster radula Ait., var. strictus (Pursh) Gray was found generally distributed on heaths and boggy swales in Lubec, Maine. It has formerly been known in Maine from Mt. Katahdin and from the Dead River and Rangeley regions.

Iva xanthiifolia Nutt. Many plants three meters high were seen in a thicket with *Solidago canadensis* and other native species near the railroad station at New Limerick, Aroostook County, Maine. The species seemed entirely at home, though presumably of recent introduction.

Bidens hyperborea Greene, Pittonia iv. 257 (1901), discussed in more detail by Fernald in Rhodora x. 201 (1908), has been known only from James Bay and from brackish or saline mud at the estuaries of rivers of the Gaspé Peninsula, Quebec. In August it was found in brackish mud along Winnegance Creek, Phippsburg, Maine, thus extending its range from the north shore of the Baie des Chaleurs.

Matricaria Chamomilla L., var. coronata (J. Gay) Cosson & Germain, differing from the typical form of the species in having the pappus in the form of a broad dentate crown instead of obsolete, is an abundant weed of roadsides, waste-places, sea-strands, etc. in easternmost Maine. This plant, which has the delicious pine-apple fragrance of *M. suaveolens*, was seen in Maine in the towns of Eastport, Lubec, Trescott, Whiting, and Calais, and was afterward seen along the streets of St. John, New Brunswick.

Artemisia frigida Willd. Several clumps were seen in gravel about the yards of the Canadian Pacific Railway, Fairville, New Brunswick, though apparently not so thoroughly established as *A.* ludoviciana Nutt.

Artemisia pontica L., an old garden plant rarely flowering with us, is spreading to roadsides, railroad yards, etc., and should receive recognition in our manuals. It was found in considerable abundance

in the yard of the Grand Trunk Railway at Portland, Maine, and by a roadside in Pembroke, Maine.

Arnica mollis Hook., var. petiolaris Fernald. A small colony of this plant was found in a marly, springy spot at the foot of a steep bank below the Falls of the Aroostook River about one mile above Four Falls, New Brunswick. This is the first station recorded east of Moxie Falls, Somerset County, Maine.

Lapsana communis L. This plant was found in considerable abundance along the pavement on one of the streets of Rockland. It has previously been found on Mt. Desert Island and perhaps elsewhere, but is a rare plant in Maine.

Sonchus arvensis L., var. glabrescens Wimmer & Grabowski, Fl. Sil. pt. 2, ii. 220 (1829). In the typical form of the species the peduncles and involucre are more or less densely glandular-hirsute. This form is the ordinary one found throughout the range of the species in America. However, a colony was found along the strand on Carlow Island, Passamaquoddy Bay, the involucres and pedicels of which were entirely glabrous. This evidently is the form recognized in Europe as var. *glabrescens* W. & G. In addition to these plants we have seen specimens of this variety from Maine: Limestone, September 10, 1896, *Fernald*; Dover, September 1, 1894, *Fernald*. Massachusetts: Lenox, August 24, 1902, *R. Hoffmann*. Ohio: near Soldier's Home, Erie County, August, 1902, *W. P. Holt*. It seems, therefore, to have a fairly wide distribution.

Lactuca canadensis L., and L. hirsuta Muhl. Although no specimens of *L. hirsuta* were collected, the occurrence of occasional plants of *L. canadensis* with the petioles and midribs of the basal leaves hirsute makes it desirable to distinguish these two species, if possible, by some other characters. A study of the material in the Gray Herbarium and the Herbarium of the New England Botanical Club shows that good characters may be drawn from the achenes, and that there are also some other minor differences. The leaves, though variable as in most species of *Lactuca*, nevertheless show some tendencies which are helpful. The two species differ as follows:—

L. hirsuta. Lateral leaf-divisions oblong-obovate, commonly broadest above the base, often more or less truncate, usually dentate: involucre, when fully developed, 16–22 mm. long: mature achenes 7–9 mm. long from base to tip of beak: pappus 9–12 mm. long.

L. canadensis. Lateral leaf-divisions rarely oblong or obo-

vate, usually lanceolate to linear, commonly broadest at the base, usually acute and frequently entire: involucre 10–14 mm. long: mature achenes 5–6 mm. long: pappus 5–7 mm. long.

Hieracium floribundum Wimm. & Grab. This is the common introduced *Hieracium* of the fields and roadsides in southeastern Washington County, Maine, and has been collected as far east as St. John, New Brunswick. It is now established in great abundance around Passamaquoddy Bay, but was first recorded from America by Dr. Kennedy (Rhodora, iv. 25) who found it sparingly at Cutler in 1901.

Explanation of Plate 84.

Fig. a. *Montia fontana*, plant and seed, natural size, and seed × 15.
Fig. b. *M. rivularis*, portion of plant and seed, natural size, and seed × 15.
Fig. c. *M. lamprosperma*, plant and seed, natural size, and seed × 15.

NOTES ON CONNECTICUT MOSSES.

G. E. Nichols.

Since the publication a little over a year ago of "The Bryophytes of Connecticut" [1] a number of additions have been made to the mosses known to occur within the state and, as will appear in the present paper, it has been found necessary to make several changes in the list of species given in the catalogue.

Revision of the Ephemereae.

During the past fall the writer devoted especial attention to the study of the *Ephemereae*, a sub-family of the *Funariaceae* which, according to the classification of Brotherus,[2] contains the two North American genera *Nanomitrium* Lindb.[3] (= *Micromitrium* Aust.[4]

[1] Evans, A. W., and Nichols, G. E. Conn. Geol. and Nat. Hist. Surv. Bull. 11. 1–203. Hartford. 1908.
[2] Engler-Prantl's Natürliche Pflanzenfamilien Part 1. **3**:512. 1903.
[3] Notis. pro Fauna et Flor. Fenn. **13**:408. 1874.
[4] Musci Appal. Exsic. 1870.

not Spruce[1]) and *Ephemerum* Hampe.[2] In both of these genera the leafy shoot is very short and consists merely of a small, bud-like cluster of leaves borne on an exceedingly short stem and surrounding the diminutive sporophyte. The whole plant in *Nanomitrium* is scarcely more than 1 mm. in height, and even in the larger forms of *Ephemerum* rarely exceeds 2 mm. From closely related forms the *Ephemereae* are distinguished by the fact that the green protonema from which the leafy shoots arise persists throughout the life of the plant. In some species, for example in *E. cohaerens*, the protonema becomes discolored with age and is not conspicuous at the time the spores mature; but in many cases, especially in species which, like *E. spinulosum*, grow in very wet places, this structure forms a conspicuous, dark green mat covering the substratum about the leafy shoots. All of the species of *Nanomitrium* and *Ephemerum* are annuals. For the most part they grow in wet or moist localities, particularly in the beds of dried up ponds, and usually in open situations. Although some species occur on gravelly soil, loamy clay or humus appear to afford the most favorable substrata.

As pointed out by Salmon,[3] *Nanomitrium* differs from *Ephemerum* primarily in the fact that in the former genus certain cells of the capsule-wall are differentiated in such a way that the capsule possesses a well marked rudimentary lid. The presence of a lid is indicated in Austin's original description of the genus and is clearly shown in Sullivant's *fig. 6* of his plate of *N. Austini* (Sull.) Lindb.[4] In *Ephemerum*, on the other hand, no traces of such a structure are apparent, but the capsule dehisces irregularly. In *Nanomitrium*, moreover, during the development of the sporophyte the "spore-sac" breaks down, and in the mature capsule the spores are enclosed only by the thin and delicate outer layer of the capsule-wall. In *Ephemerum*, on the contrary, the "spore-sac" persists, so that the ripe spores are enveloped by a firm, double wall of cells. Even under a dissecting microscope this difference in the walls of the mature capsules is easily demonstrated, for while in *Nanomitrium* the capsule is easily broken, it usually requires considerable picking with a needle to release the spores in *Ephemerum*. Other differences between the two genera are the

[1] Catalog. Musc. Amaz. et Andes. 2. 1867.
[2] Flora **20**:285. 1837.
[3] Journ. Linn. Soc. Bot. **34**:163–170. 1899.
[4] Icones Musc. Suppl. *pl. 12*. 1874.

presence of stomata in the capsule-wall of *Ephemerum*, their absence in *Nanomitrium*, and a marked difference in the size of the spores, which are sometimes 80 μ in diameter in *Ephemerum* but rarely more than 35 μ in *Nanomitrium*.

Nanomitrium Austini was described by Sullivant[1] from material collected by Austin at Closter, New Jersey, in 1865. Later, in 1878, Austin found it at Rockland, New York, and these two stations appear to have been the only localities known for this minute moss until the fall of 1909 when the writer collected it in the town of Hamden, Connecticut.[2] The plants there grew on the clayey banks of a ditch and were scarcely perceptible without the aid of a lens. These specimens agree closely with those distributed by Austin.[3] Between *N. Austini* and *N. synoicum* (James) Lindb., our other native species, however, the differences are not great. The spores of *N. synoicum* are said to be more papillose than those of *N. Austini*, and the leaves of the former are often nearly entire, while in the latter they are serrate. One of the most striking differences that the writer has noted between the two is in their size and habit. In *N. Austini* the axis of the leafy shoot is in most cases very short and the whole plant appears almost sessile. In *N. synoicum*, on the other hand, the axis is often 0.65 mm. in length, so that the sporophyte with its enveloping cluster of leaves is perceptibly raised above the level of the ground.

The species of *Ephemerum* appear to be much more widely distributed than those of *Nanomitrium*, yet it is impossible to get any satisfactory idea of their range, partly owing to the fact that on account of their small size they are seldom collected, but principally because the characters which separate the various species are inadequately understood. For example, in "The Bryophytes of Connecticut" *E. serratum* is listed from five stations. The specimens from these various localities were determined by five different authorities. Yet upon careful examination all five specimens were found to be, not *E. serratum*, but *E. spinulosum*.

The classification of species in *Ephemerum* is based primarily on leaf characters, and two general groups may be defined. In one group are placed those forms in which the leaves do not possess a midrib,

[1] Icones Suppl. 21. *pl. 12.* 1874.

[2] Specimens from this station distributed by Holzinger, Musci Acro. Bor.-Amer. No. 268.

[3] Musci. Appal. Exsic. No. 45. 1870.

but consist throughout of a single layer of cells. To this group belong *E. megalosporum* (Aust.) Salm. and *E. serratum* (Schreb.) Hampe. These two species are readily distinguished. In *E. megalosporum* the leaves are obscurely serrulate, and stomata are present in the upper, as well as in the lower, part of the capsule-wall. In *E. serratum* the leaves are strongly serrate, while the stomata are restricted to the base of the capsule.

The second group includes all species in which the leaves possess a midrib. The midrib, however, even when present may easily be overlooked, since it is very poorly defined and in most species consists of little more than a double layer of cells which are similar in size and form to the ordinary cells of the leaf. The species in this group may be further divided into two well defined sub-groups. In the first, of which *E. cohaerens* (Hedw.) Hampe appears to be the only North American representative, the leaves are ovate-lanceolate in shape and are smooth or nearly smooth, except on the midrib. *E. cohaerens* is the most robust of our native *Ephemereae*. To the second sub-group belong *E. crassinervium* (Schw.) C. Müll., *E. papillosum* Aust., *E. spinulosum* Schimp., *E. sessile* (Br. & Sch.) C. Müll., and *E. hystrix* Lindb., of which the first three have been found in Connecticut. These differ from *E. cohaerens* in their more delicate habit and narrower, more lanceolate leaves which are always more or less papillose on one or both surfaces. Cardot[1] considers *E. papillosum, spinulosum, sessile,* and *hystrix* simply as well marked varieties of *E. crassinervium.* But after a careful examination of a considerable number of specimens of the three Connecticut species the writer has arrived at the conclusion that these, at any rate, are worthy of specific rank.

The characters which distinguish *E. crassinervium* from *E. spinulosum* are difficult to describe. Often some of the leaves of an *E. spinulosum* plant are indistinguishable from leaves of *E. crassinervium,* so that it is only after a careful examination of all the leaves of a specimen that its identity can be established. In both species the leaves taper gradually to the apex and are serrate, especially in the upper half. In typical leaves of *E. crassinervium,* the teeth are relatively short and are produced by the slight protrusion of the upper ends of some of the marginal cells. In *E. spinulosum,* on the

[1] Bull. Herb. Boissier **7**:361–363. 1899.

other hand, the teeth are much longer and as a rule a much greater portion of the tooth-producing cell protrudes; in many cases, in fact, almost the entire cell projects outward in the form of a tooth, and frequently the whole upper half of the leaf is little more than an excurrent midrib from which long teeth project in all directions. *E. papillosum* differs from the two species above mentioned in its broader, much more papillose leaves, and in the structure of its calyptra which is rendered markedly papillose by the projection of the outer walls of its cells. According to Austin's description [1] the leaves of *E. papillosum* are narrower than those of *E. crassinervium* but an examination of Austin's specimens of both species has failed to verify this observation. The character of the leaf margin is intermediate between that of *E. crassinervium* and *E. spinulosum.*

The revised list of *Ephemerum* species found in Connecticut is here given.

E. megalosporum: Orange (Evans, 1891).

E. cohaerens: East Haven (Evans, 1891), New Haven (G. E. N.).

E. crassinervium: Branford (G. E. N., 1909).

E. papillosum: New Haven and North Haven (G. E. N., 1909).

E. spinulosum: Hartford (Miss Lorenz), East Haven (Evans), New Haven (G. E. N.), Orange (J. A. Allen, 1879), Oxford (Harger), Portland (G. E. N.), and Norwich (Setchell).

For the sake of convenience the diagnostic characters of these five species are summed up in the following key.

1.	Leaves without a midrib	2
	Midrib present, although often indistinct	3
2.	Leaves obscurely serrulate; stomata present in upper half of capsule	*E. megalosporum.*
	Leaves strongly serrate; stomata restricted to base of capsule.	*E. serratum.*
3.	Leaves ovate-lanceolate, smooth except on the midrib	*E. cohaerens.*
	Leaves narrowly lanceolate, distinctly papillose	4
4.	Calyptra conspicuously papillose	*E. papillosum.*
	Calyptra smooth or nearly so	5
5.	Teeth in apical half of leaves usually short	*E. crassinervium.*
	Teeth in apical half of leaves usually long	*E. spinulosum.*

The writer is about to undertake a revision of the North American species of *Nanomitrium* and *Ephemerum*, and a considerable amount of material for study is already at hand. Since, however, it is desired to make the work as thorough and comprehensive as possible, it will be greatly appreciated if American bryologists will cooperate through the loan or exchange of specimens.

[1] Musci Appal. Exsic. No. 50. 1870.

Recent Additions.

Physcomitrium immersum Sull. Three stations for this interesting North American species were found during the autumn of 1909, viz.— Hartford (Evans), Wethersfield (Miss Lorenz), and Portland (G. E. N.). In all three localities the plants grew on damp sand or clay in places which are usually flooded during the spring by the water of the Connecticut river. Although not heretofore reported from New England it is probable that *P. immersum* is not uncommon here, at least in the valley of the Connecticut river. Outside of New England it has been found as far north as Quebec [1] and ranges south and west to Delaware and Colorado respectively. This species is frequently confused with *Aphanorrhegma serratum* (Hook. & Wils.) Sull., to which it bears a close resemblance. Even in the field, however, the two may be separated from one another with reasonable certainty, *P. immersum* being somewhat more robust than the *Aphanorrhegma*, and where abundant occurring in lax tufts which are quite different from the more or less depressed tufts of *Aphanorrhegma*. Moreover, as pointed out by Mrs. E. G. Britton,[2] in *Aphanorrhegma* the capsule splits exactly in the middle and the cells of the capsule-wall possess pronounced collenchymatous thickenings at their angles, while in *P. immersum* the line of dehiscence is invariably situated above the middle of the capsule and the cells of the capsule-wall are relatively thin-walled throughout.

Aulacomnium androgynum (L.) Schw. This species has been collected in New York (Miss Marshall), Maine (J. F. Collins), and Massachusetts (C. E. Faxon, and others), but the writer has been unable to find references to its occurrence in other eastern states. The Connecticut station is in the town of Branford (G. E. N., 1909), where the plants grow in considerable abundance in crevices of gneissoid ledges at the border of a salt marsh. *A. androgynum* apparently does not fruit in eastern North America, but it may readily be distinguished from other species of Aulacomnium by its peculiar organs of vegetative reproduction. These consist of fusiform, multicellular gemmae borne on short stalks and produced in great numbers at the tips of slender pseudopodia. The densely crowded masses of gemmae

[1] Macoun, J., Cat. Can. Plants. **6**:120. 1892.
[2] Bull. Torr. Bot. Club. **21**:190, 191. 1894.

have the shape of minute balls. *A. palustre* (L.) Schw. also produces pseudopodia which bear at their apices gemmiform "Brutblätter," but the latter are obviously merely small metamorphosed leaves and are not at all like the gemmae of *A. androgynum*.

Philonotis marchica (Willd.) Brid. (= *P. Muhlenbergii* Schw.) Although *P. fontana* (L.) Brid. is the only species of the genus credited to Connecticut in the 1908 list, *P. marchica* should also have been included. This had been reported from the state (as *P. Muhlenbergii*) by Renauld and Cardot,[1] but the reference was overlooked. The specimens upon which this report was based were collected in Cornwall (1887) by Prof. H. A. Green and were determined by Cardot. The writer has recently collected it in Salisbury also. In the opinion of both Cardot[2] and Dismier[3] *P. Muhlenbergii* is not distinct as a species from *P. marchica*. *P. marchica* ranges throughout the northern United States and Canada and has been reported from all the New England states except New Hampshire.

Philonotis caespitosa Wils. In connection with a revision of the North American species of *Philonotis* which he has just completed, Dismier has kindly examined all the available Connecticut material of this genus and finds that a number of specimens which have passed as *P. fontana* should be referred to *P. caespitosa*. Previous to Dismier's critical study of the genus this species had not been recognized as occurring at all on the North American continent, although it was known to be not uncommon in Europe and had been reported from Greenland. Apparently, however, it is widely distributed, at least through the eastern half of the continent. Dismier reports it from all the New England states but Vermont, and in the herbarium of the New York Botanical Garden are specimens from New York, New Jersey, Pennsylvania, Ohio, and Wisconsin, as well as from Newfoundland and New Brunswick. The Connecticut stations are: Salisbury and Stafford (G. E. N.), Canterbury (Mrs. Hadley), Easton (Eames), Huntington and Hamden (G. E. N.), New Haven (Eaton, 1856), and Ledyard (G. E. N.).

The characteristics by which the Connecticut species of *Philonotis* may be distinguished are indicated in the following key:

1. Marginal teeth of stem leaves always simple and sharp; papillae situated at the upper angles of the leaf cells . . . . *P. marchica*.

[1] Musci Amer. Sept. 32. 1893.
[2] Bull. Herb. Boissier **7**:307. 1899.
[3] Rev. Bryol. **34**:50, 51. 1907.

Marginal teeth of stem leaves double, at least in the lower part of the leaf; papillae, at least in the basal half of the leaf, situated in the lower angles of the cells, or in the middle 2

2. Stem leaves falciform, not plicate, margin plane; perigonial leaves acute . . . . *P. caespitosa.*
Stem leaves rarely falciform, plicate at base, margin revolute below middle of leaf; inner perigonial leaves obtuse . . . . . *P. fontana.*

Pterigynandrum filiforme (Timm) Hedw. According to Dr. Grout[1] this moss is not uncommon, but it had apparently been overlooked in Connecticut until the fall of 1909 when the writer happened to discover a few sterile, depauperate specimens growing on a dry ledge in the town of Bethany. In its general aspect, as remarked by Grout, *P. filiforme* resembles some of the species of *Leskea.* The plants ordinarily have, however, a marked yellowish cast, the branches are usually numerous and are all curved at the tip, pointing in the same direction, while frequently slender flagelliform branches are developed. The leaf cells are considerably longer than in *Leskea,* except on the flagelliform branches where they are often quite short.

Pogonatum brachyphyllum (Michx.) Beauv. This typically southern seaboard species has been collected in most of the states bordering on the coast from Texas to New Jersey, but heretofore it has not been reported from New England. During the past fall the writer had the good fortune to find it in the town of Branford. The plants grew on earth underneath a large bowlder near the shore of Long Island Sound, the entire colony being restricted to an area less than five feet in length by one in width. A search of the adjacent shore line for several miles has as yet failed to reveal further traces of this interesting form. The plants first collected bore either immature or old sporophytes, but a recent collection shows that the spores are ripe in this latitude about the middle of April. *P. brachyphyllum* resembles somewhat the common *P. tenue* (Menz.) E. G. Britton, but it is readily distinguished by its blunt, entire leaves.

Drepanocladus aduncus (L.) Warnst.

All specimens listed in "The Bryophytes of Connecticut" as *Drepanocladus aduncus* (L.) Warnst. (p. 168) must be referred to *D. subaduncus* Warnst. (p. 168). *D. aduncus* has not yet been found in Connecticut, although it is probable that it occurs in the more northern,

[1] Mosses with Hand Lens and Microscope. 255. 1908.

hilly parts of the state. Concerning the identity of the true *D. aduncus* (=*Hypnum aduncum*) the most varied opinions have been and are still held by bryologists. What appears to the writer to be the most satisfactory solution of the problem has been offered by Warnstorf, and the views of this author, as stated in a recent letter, will be presented briefly. That the binomial *Hypnum aduncum* was first used by Linnaeus [1] is universally admitted. Hedwig,[2] however, misunderstood the application of the name as used by Linnaeus and described as *H. uncinatum* the same moss to which Linnaeus had already given the name *H. aduncum*, while at the same time [3] he misapplied the latter name to a collective group of *Harpidium* (=*Drepanocladus*), forms having falcate leaves, with the diagnosis: "Trunco erecto, ramis patulis, foliis ovato-acuminatis incurvis summitatum secundis...." From this group several species, viz.— *H. Kneiffii* Schimp., *H. Sendtneri* Schimp., etc., have since been split off, and at the present time opinion is divided as to the identity of Hedwig's *H. aduncum*. In view of these facts, and with the hope of clearing up matters, Warnstorf, following the procedure of S. O. Lindberg,[4] has dropped the Hedwigian combination *H. uncinatum*, which had been retained by most bryologists, in favor of the original Linnaean name *H. aduncum*, while he has designated as *Drepanocladus subaduncus* a *Harpidium* form which Hedwig certainly included in his *H. aduncum* group. To sum up, *Hypnum aduncum* Hedw. of American bryologists should be called *Drepanocladus subaduncus* Warnst., while *Hypnum uncinatum* Hedw. of American bryologists should be called *Drepanocladus aduncus* (L.) Warnst., the binomial *H. uncinatum* being thus dropped altogether.

In connection with the preparation of this paper thanks are due to Mrs. E. G. Britton, M. J. Cardot, Prof. J. F. Collins, Prof. W. G. Farlow, Mr. C. E. Faxon, Dr. A. J. Grout, Mr. E. L. Rand, and Dr. L. W. Riddle for data regarding the distribution of various species, or for the loan of specimens. The writer also wishes to express his appreciation to M. G. Dismier and Herr C. Warnstorf for their kindness in determining specimens of *Philonotis* and of *Drepanocladus subaduncus* respectively.

Yale University.

[1] Species Plantarum 1126. 1753.
[2] Descr. et Adumbr. Musc. **4**:65. *pl. 25.* 1797.
[3] L. c. 62. *Pl. 24.*
[4] Musci Scandinavici. 33. 1879.

RANGE EXTENSION OF SCIRPUS SMITHII VAR. SETOSUS.

Bayard Long.

During a somewhat critical examination, recently, of the material of *Scirpus debilis* in the Herbarium of the Philadelphia Botanical Club, I found two sheets which were very evidently to be referred, not to *S. debilis,* but to *S. Smithii* — slender plants with the erect involucral leaf, and the characteristic, very flat achene. But the interesting feature was the presence of a perianth of four or five long slender bristles, in these specimens. Formerly, as herbarium material shows, these two species were very commonly separated by the presence or absence of bristles: plants with bristles being apparently referred without question to *S. debilis* and those without bristles, to *S. Smithii.* But it has been shown by Prof. Fernald that the distinguishing characters are to be found in the achene rather than the perianth, and that there is a form of *S. Smithii with* bristles and one of *S. debilis without* bristles.[1] The latter condition (of a variety differing from the species in the absence of bristles) is paralleled, as is well known, in several other Cyperaceae: *Eleocharis palustris* var. *calva, E. Engelmanni* var. *detonsa,* and the lately described *E. intermedia* var. *Habereri.*

Our two sheets are from Clementon, Camden Co., New Jersey, and Middletown, New Castle Co., Delaware. Another specimen in the Herbarium of the Academy, from Milford, Del., represents the same form. A few culms and achenes were removed and sent to Prof. Fernald and he has kindly verified their identification as *S. Smithii* var. *setosus.* Since this plant has been formerly known only from Maine, western Massachusetts and Illinois, our plants make a considerable southerly range extension. As Prof. Fernald suggests in his letter, from the scattered localities previously known, a natural expectation was that the variety would turn up probably throughout the range of the species. It is of interest to have, in part at least, shown this to be true. He further says: "In New England, varieties differing in the presence of absence of the perianth are usually — always so far as we have evidence — found quite by themselves and not mixed with the other form." Our stations very probably represent this condition, but conclusive evidence, as of field-notes, is naturally lacking. The

[1] Rhodora, III. 250 (1901).

material representing the Clementon station, however, consists of two plants on the sheet, and both are of the same form.

A suggestive point, however, comes out when the distribution and habitat of the typical form, and of the variety, in the Philadelphia region, is looked into. All our typical *S. Smithii* comes, so far as I know, from the immediate shores of the main course of the Delaware River, commonly within tide-water limits, and frequently submerged at high-water; while the three stations for the variety are a considerable distance back from the river,— in the case of Clementon about eleven miles — and naturally have a habitat distinctly different, the Clementon station being a fresh-water pond. This may all be coincidence, however, but it would seem to show that there are interesting points still to be solved concerning the distribution and habitat of species and varieties of this class.

Academy of Natural Sciences, Philadelphia.

Tetraplodon australis in Massachusetts.— While collecting lichens near a small pond in the vicinity of North Brookfield, Mass., in June, 1908, I found in the sphagnum near the edge of the pond, a moss which I did not recognize. Later this proved to be *Tetraplodon australis* Sull. & Lesq. So far as I know this moss has not before been reported from Massachusetts, possibly not from New England.— Frank Dobbin, Shushan, New York.

Note on Scheuchzeria palustris L.— The records in the hands of the Local Flora Committee show that this is a rare plant in the Boston District — partly from lack of mossy peat-bogs, perhaps. I found a good station for this species in Sharon, Massachusetts, June 27, 1909. Back of Billings Pond is a smaller pond surrounded by woods, but with a wide margin of peat-moss. In this moss was the *Scheuchzeria*, along with such other bog-lovers as *Decodon verticillatus* (L.) Ell., *Andromeda glaucophylla* Link., and *Gaylussacia dumosa* (Andr.) T. & G. The last was still in blossom, but the *Scheuchzeria* was already well fruited. This record was accidentally omitted from the list.— C. H. Knowlton, for the Local Flora Committee.

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F. Schuyler Mathews del.

MONTIA FONTANA (a), RIVULARIS (b), AND LAMPROSPERMA (c).

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NOTES ON SOME NORTHEASTERN SPECIES OF SPERGULARIA.

M. L. Fernald and K. M. Wiegand.

During the past summer observations upon *Spergularia* at various stations on the New England coast made it clear, that our ordinary interpretation of specific limits in the maritime species is not entirely satisfactory; and subsequent study of much herbarium material shows that certain of the conclusions of Kindberg based upon the seed-characters of these plants should be sustained. Upon the Atlantic coast of North America there are three very clearly distinguished plants (besides the common *S. rubra*, which is rarely found in saline habitats). One of these plants, with the capsule much longer than the comparatively short round-tipped sepals, and with large seeds, is without doubt *S. canadensis* (Pers.) G. Don, which was based by Persoon upon Michaux's *Arenaria rubra* β from the mouth of the River St. Lawrence. The Michaux material is preserved at the Muséum d'Histoire Naturelle in Paris, and examination of his specimens has confirmed our present interpretation of the species.

The other two maritime plants are passing, in our current manuals, under the name *Spergularia marina* (L.) Griesb., or *Tissa marina* (L.) Britton. Both of them, like *S. canadensis*, may have all the seeds in a capsule wingless or some of them with a thin friable wing; but one of the two plants has the seeds quite smooth (except for the occasional wing), while the other has them glandular-papillose. Although these characters of the seeds have recently been treated as of no diagnostic value, still the plant with papillose seeds has most of the flowers (at least the uppermost) subtended by very short bracts or none at all,

thus giving the upper half of the inflorescence an almost naked appearance. The plant with smooth seeds, on the other hand, has the flowers all subtended by elongate leaf-like bracts which so closely resemble the foliage-leaves as to give the inflorescence the appearance of a series of axillary flowers. In a very large number of American specimens examined, these two characters of inflorescence and seeds appear so regularly concomitant that, although two or three doubtful specimens have been seen, the plants seem to be well-distinguished species. It is not improbable that the intermediate specimens, which are all from one station, are hybrids. In the case of the smooth-seeded plant there seems to be no question as to the name to be taken up. This plant is *Lepigonum leiospermum* of Kindberg, who calls attention to both the seed- and bract-characters. It was based in part upon material from Massachusetts and Pennsylvania, and later transferred to *Spergularia* by F. Schmidt.

The other coastal plant, with papillose seeds and with the upper flowers nearly bractless, although very common, has a most perplexing nomenclatorial history. In 1753 Linnaeus described in the Species Plantarum an *Arenaria rubra β marina*. A study of the description, citations, and possibly specimens upon which this was based has convinced many European authors that the variety consisted of diverse elements, and so far as we can judge this seems to be true. Authors subsequent to Linnaeus have spent much time and discussion in attempts to make the name apply more definitely to one or the other of these component parts. The results have thus far proved futile, as have the attempts to refer the resulting specific name, *Arenaria marina*, of the early authors to any one species. Therefore, since the name *marina* is one which, as practice shows, has become "a permanent source of confusion or error" the writers feel that intelligibility and clearness in advancing knowledge of the plants themselves will be best served by allowing it to lapse in accordance with Article 51 (4) of the Vienna Code. In so doing they follow Rouy & Foucaud, who say: "La synonymie des noms anciêns des *Arenaria* ou *Spergularia media* et *marina* est devenue pour ainsi dire inextricable; aussi estimons-nous, à l'exemple de plusieurs auteurs contemporains, qu'il convient d'abandonner ces noms, qui ne peuvent actuellement que prêter à confusion." [1] Kindberg used for our annual plant with papillose

[1] Rouy et Foucaud, Fl. Fr. iii. 302 (1896).

seeds and with the upper flowers without elongate leafy bracts the name *Lepigonum salinum* based upon *Spergularia salina* J. & C. Presl; and the latter name is taken up in this sense by Gürke[1] and by Druce.[2] Consequently, in view of the hopeless confusion surrounding the name *marina*, it seems wisest to retain for our annual maritime plant with papillose seeds and aphyllous upper flowers the name *Spergularia salina* J. & C. Presl, which is the earliest name that has been definitely attributed to our plant. In 1843 Griesbach used the name *Spergularia marina* clearly for our plant, but as this was some twenty-four years later than the Presl publication of *S. salina* it need cause no confusion.

One other species of *Spergularia* is known in our eastern flora. This is a plant with thickish, apparently perennial root, long pedicels, larger capsule, and comparatively large seeds with a broad firm persistent and less erose wing. This plant is now rather common about the head of Onondaga Lake in New York, and in the Synoptical Flora of North America and in the 7th edition of Gray's Manual is called *S. media*. It is interesting to note that although this plant is now not at all rare on the shores of Onondaga Lake, it was not known there in 1865. Paine in his "Plants found in Oneida County and Vicinity"[3] enumerated no species of *Spergularia*; and Clinton,[4] in an enumeration of the maritime plants which occur on the saline borders of Onondaga Lake, did not record it. Its subsequent discovery and its present abundance indicate that this species is of recent introduction, and that in this saline region it has become established as have various Old World species which now abound about Boston Harbor.[5] But that this perennial plant with long pedicels and winged seeds should not be called *Spergularia media* is a conclusion which has been reached by many of those who have specially studied its nomenclatorial status. *Arenaria media* L. has been shown[6] to consist in part of a *Spergula*, in part of an annual *Spergularia* with papillose seeds (our *S. salina*), and in part of the perennial plant under discussion; and like *Arenaria rubra β marina* of Linnaeus it has been subsequently interpreted in so many ways as to become a "permanent

[1] Gürke, Plantae Europaeae, ii. 195 (1899).
[2] Druce, List of British Plants, 12 (1908).
[3] J. A. Paine in 18th. Ann. Rep. Univ. N. Y. (1865).
[4] G. W. Clinton in 18th. Ann. Rep. Univ. N. Y. (1865).
[5] See Rhodora, xi. 120, 239 (1909).
[6] See Hiern, Journ. Bot. xxxvii. 319 (1899).

source of confusion or error" and is now so treated by many European authors. Rouy & Foucaud [1] (see quotation above), and Gürke [2] take up for our plant the name *Spergularia marginata*, (DC.) Kittel, based upon *Arenaria marginata* DC.; Hiern calls it *Alsine marina* Wahlenb. and applies the name *Alsine media* Crantz to *Spergularia salina* J. & C. Presl, although it appears from Hiern's note that Crantz's species (assuming that it has been positively identified) was also a mixture of a *Spergularia* and a *Spergula*. Britten & Rendle [3] call it *Alsine marginata* Reichenb. (treating *S. salina* J. & C. Presl as *Alsine media* Crantz); but, in view of the fact that *Spergularia* was included in the list of *nomina conservanda* adopted at Vienna, "a list of names which must be retained in all cases" (Art. 20), we cannot agree with those who throw aside the generic name *Spergularia* for *Alsine* (see Journ. Bot. XLV. 436), a name which itself has been subject to the most diverse interpretation. Druce [4] treats the perennial *Spergularia marginata* (DC.) Kittel as *S. media* (Pers.) Presl (= *Arenaria media* L. in part), and maintains of *Alsine media* Crantz the name *Spergularia salina* J. & C. Presl. In view of such diversity of interpretation among those who are better situated than the writers to determine the Linnaean type, there seems no clear course open at present but to call the perennial plant with long pedicels and large seeds by the name which leaves no doubt in the mind as to the plant intended, and in so doing to follow a practice which has many adherents in Europe. The first unincumbered name for this plant seems to have been *Arenaria marginata* DC., and as a *Spergularia* the plant should be known as *S. marginata* (DC.) Kittel.

We are inclined to agree with most European authors that the character of pubescence in these saline species is not of much diagnostic value. *Spergularia marginata*, in practically all specimens examined, is glandular-pubescent at least above, and *S. canadensis* is almost as regularly entirely glabrous. In each of the other two species, *S. salina* and *S. leiosperma*, there is a hairy and a smooth form.

The leading characters and distribution of the fleshy Spergularias in northeastern North America may be summarized as follows:

Mature capsules large (6.5–9 mm. long), about twice the length of the calyx: pedicels at maturity about twice as long as the capsule: seeds, excluding the

[1] Rouy et Foucaud, Fl. de France, iii. 302 (1896).
[2] Gürke, l. c. 197.
[3] Britten & Rendle, List of British Seed-Plants and Ferns, 7 (1907).
[4] Druce, l. c.

wing, 0.7–1 mm. long, smooth, all with a broad rather firm scarcely erose wing: stamens 8–10: bracts very short, and inflorescence therefore appearing naked: free portion of the stipules ovate, acuminate: plant with a stout root, seemingly perennial. . . . . 1. *S. marginata*

Mature capsules smaller (3–5.5 mm. long): seeds either winged or wingless, often both kinds in the same capsule: margin of the more friable wing strongly erose: stamens 5 or fewer: plants with more slender root, chiefly annual.

Seeds large, 1–1.33 mm. long (exclusive of the wing when present), smooth, rarely papillose: capsule subglobose-ovoid, about twice the length of the calyx: sepals broadly ovate to oblong-ovate, at maturity 1.5–3 mm. long, rounded at tip: free portion of stipules very short, truncate or apiculate: plant glabrous. . . . . . 2. *S. canadensis*

Seeds smaller, 0.5–0.8 mm. long: capsule conic-ovoid, equaling or a little exceeding the calyx: sepals ovate to lanceolate, obtuse to acutish, at maturity 3–3.5 mm. long: free portion of the stipules long, acuminate: plants glabrous or glandular-pubescent.

Seeds glandular-papillose: upper green bracts of the inflorescence minute or wanting. . . . . 3. *S. salina*

Seeds smooth: upper green bracts usually conspicuous. 4. *S. leiosperma*

1. S. MARGINATA (DC.) Kittel, Taschenb. Fl. Deutsch. ed. 2, 1004. (1844). *Arenaria rubra β marina* L. Sp. Pl. 423 (1753) in part. *A. media* L. Sp. Pl. ed. 2, 606 (1762) in part. *A. marina* All. Fl. Pedem. ii. 114 (1785)?. *A. marginata* DC. Fl. Fr. v. 793 (1815). *Lepigonum marinum* Wahlenb. Fl. Gotob. 47 (1820); Kindberg, Monog. Lepig. 18 (1863). *Spergularia media* Presl, Fl. Sic. 161 (1826); Robinson in Gray, Synop. Fl. i. pt. 1, 252 (1897) as to N. Y. plant; Robinson & Fernald in Gray, Man. ed. 7, 379 (1908) as to N. Y. plant. *Alsine marina* Wahlenb. Fl. Suec. pt. 1, 281 (1824); Hiern, Journ. Bot. xxxvii. 319 (1899). *Alsine marginata* Reichenb. Fl. Germ. Exc. 566 (1832). — Saline soil about salt springs near Onondaga Lake, NEW YORK, apparently introduced from Europe. Specimens seen from near Salina (*Fry*, fide Robinson l. c.); near Baldwinsville 1894 (*W. M. Beauchamp*); Syracuse Salt Marsh, August 17, 1901 (*W. W. Rowlee*), August 18, 1902 (*K. M. Wiegand*, No. 27).

2. S. CANADENSIS (Pers.) G. Don, Syst. i. 426 (1831), as to synonym but not description. *Arenaria rubra β* Michx. Fl. Bor. Amer. i. 274 (1803). *Arenaria canadensis* Pers. Synop. i. 504 (1805). *Tissa salina* Britton, Bull. Torr. Bot. Cl. xvi. 127 (1889) as to description, not synonym. *Buda borealis* Wats. & Coulter in Gray, Man. ed. 6, 90 (1890). *Tissa canadensis* Britton, Mem. Torr. Bot. Cl. v. 152 (1894). *Spergularia borealis* Robinson in Gray, Synop. Fl. i. pt. 1, 252 (1897). Brackish or saline soils, Gulf of St. Lawrence to Connecticut, most abundant northward; apparently also on the coast of Washington. Among the large number of specimens examined a few may be cited as follows. NEWFOUNDLAND: Frenchman's Cove,

Bay of Islands, August 9, 1896 (*Waghorne*). Quebec: Bonne Esperance, August 28, 1882 (*J. A. Allen*); Becscie River, Anticosti, August 31, 1883 (*J. Macoun*, no. 35); Vicinity of Cap à L'Aigle, August 14, 1905 (*J. Macoun*, no. 66,770); Bic, July 25 & 26, 1907 (*Fernald & Collins*, no. 1030). New Brunswick: Bathurst, July 25, 1902 (*Williams & Fernald*); Kent County, 1870 (*J. Fowler*). Prince Edward Island: Brackley Point, August 6, 1888 (*J. Macoun*). Nova Scotia: Purcell's Cove, Halifax Harbor, September 2, 1901 (*Howe & Lang*, no. 1571). Maine: Carlow Island, Passamaquoddy Bay, August 16, 1909 (*Fernald & Wiegand*); Norwood Cove, Mt. Desert Island, September 18, 1892 (*Fernald*); Wells Beach, July 23, 1898 (*Fernald*). New Hampshire: Hampton, September 22, 1901 (*E. F. Williams*). Massachusetts: Mystic River Marshes, August 21, 1881 (*F. S. Collins*): North Dennis, July 14, 1879 (*C. N. Brainerd*). Rhode Island: Seekonk River, Providence, July 8, 1892 (*J. F. Collins*). Connecticut: salt marsh, Esker Point, Groton, September 9, 1903, *C. H. Bissell.*

3. S. salina J. & C. Presl, Fl. čech. 95 (1819); Robinson in Gray, Synop. Fl. i. pt. 1, 251 (1897). *Arenaria rubra β marina* L. Sp. Pl. 423 (1753) in part. *A. marina* Roth, Tent. i. 189 (1788) according to Kindberg, Gürke, and Rouy & Foucaud; probably not *A. marina* All. (1785). *Spergularia marina* Griesb. Fl. Rumel. et Bith. i. 213 (1843); Robinson & Fernald in Gray, Man. ed. 7, 378 (1908). *Lepigonum salinum* G. Don in Sweet, Hort. Brit. ed. 3, 69 (1839); Kindberg, Mon, Lepig. 36 (1863). *Tissa marina* Britton, Bull. Torr. Bot. Cl. xvi. 126 (1889). *Alsine media* Hiern, Journ. Bot. xxxvii. 318 (1899), perhaps of Crantz (1766).— Newfoundland and eastern Quebec to Connecticut, and possibly farther southward. Among numerous specimens examined are the following. Quebec: brackish gravelly shore, Rivière du Loup, August 2, 1902 (*Williams & Fernald*). Nova Scotia: Baddeck, Cape Breton Island, July 19, 1883 (*Burgess*), Aug. 26, 1898 (*J. Macoun*, no. 19,035); brackish soil, Windsor, August 22, 1902 (*Fernald*). Maine: old wharf, Pembroke, July 29, 1909 (*Fernald*, no. 1759); Cutler, July 26, 1902 (*Kate Furbish*); Suttons Island, Hancock Co., August 22, 1890 (*E. L. Rand*); site of old pickle factory, North Berwick, September 26, 1897 (*Parlin & Fernald*); Wells Beach, July 3, 1898 (*Kate Furbish*). Massachusetts: salt marsh, Cambridge, June 1895 (*B. L. Robinson*); salt marsh, Boston, August 2, 1906 (*C. H. Knowlton*); Oak Island, Revere, July 9, 1882 (*H. A. Young*). Rhode Island: Tiverton, September 27, 1903 (*J. M. Greenman*, no. 1765 in part); Seekonk River, September, 1876 (*W. W. Bailey*). Connecticut: Groton Long Point, Groton, September 9, 1903 (*C. H. Bissell*).

4. S. leiosperma (Kindberg) F. Schmidt, Reisen im Amurl. 131 (1868), printed as *Spergula leiosperma* but by its position between two species of *Spergularia* clearly by a typographical error. *Lepigonum*

leiospermum Kindberg, Monog. Lepig. 23 (1863). *Buda marina*, var. (?) *minor* Wats. & Coult. in Gray, Man. ed. 6, 90 (1890). *Spergularia salina*, var. ? *minor* Robinson in Gray, Synop. Fl. i. pt. 1, 252 (1897). *Spergularia salina*, var. *leiosperma* Gürke, Pl. Eur. ii. 196 (1899).— Baie des Chaleurs, Quebec, and Cape Breton Island to Connecticut and southward (Philadelphia and Carolina, *fide* Kindberg); and apparently on the Pacific Coast. The following from among many specimens are cited as characteristic. QUEBEC: damp hollows in gravelly beach, Carleton, July 21, 1904 (*Collins & Fernald*). PRINCE EDWARD ISLAND: beach, Summerside, July 21, 1901 (*J. R. Churchill*). NOVA SCOTIA: Baddeck, Cape Breton Island, July 18, 1883 (*J. Macoun*); near beach, Yarmouth, July 22, 1901 (*Howe & Lang*, no. 24). MAINE: dryish strand, Moose Island, Passamaquoddy Bay, August 16, 1909 (*Fernald & Wiegand*); strand, Pleasant Point, Perry, August 16, 1909 (*Fernald & Wiegand*); pool, Great Cranberry Isle, July 31, 1893 (*J. H. Redfield*); Wells Beach (various collectors). MASSACHUSETTS: Malden, 1867 (*Wm. Boott*); Oak Island, Revere, August 13, 1882 (*H. A. Young*); Cambridge (*Wm. Boott*); shore of "Salt Pond," Eastham, August 16, 1908 (*F. S. Collins*, no. 610); Gay Head, Martha's Vineyard, August 2, 1897 (*S. Harris*). RHODE ISLAND: without definite station, 1844 (*G. Thurber*); Tiverton, September 27, 1903 (*J. M. Greenman*, no. 1765 in part). CONNECTICUT: New Haven (collector unknown); salt marsh, Orange, August 3, 1897 (*C. H. Bissell*, no. 107).

Dwarf plants with very short pedicels and small capsules, etc. were described by Watson as *Buda marina*, var. (?) *minor*, from the Isles of Shoals and adjacent coast of New Hampshire. Similar dwarf plants have been collected on Cape Breton Island. Material collected at Guilford, Connecticut, by Mr. G. H. Bartlett has the bracts of *S. leiosperma* but the seeds papillose as in *S. salina*. This is the only clearly transitional material found in the study of the species.

TERATOLOGY IN TRILLIUM.

WALTER DEANE.

THROUGH the kindness of Mr. Edwin DeMeritte I have been enabled for the third time (See RHODORA, x. 21–24 & 214–216, 1908) to examine and record teratological specimens of the Painted Trillium, *Trillium undulatum* Willd. from his summer camp at Squam Lake, Holderness, New Hampshire. As I have previously stated, these plants were all growing in a very limited area, not more than two meters across "in the leaf-mould and scanty soil on a rocky ridge,"

not far from the shore of the lake. Mr. DeMeritte examined the spot again on May 29, 1909, and found four abnormal plants, three with three whorls of three leaves each and a perfect blossom, and one with two whorls of three leaves each and a double blossom. He took the last one and one of first three, leaving the root-stocks, pressed them, and presented them to me. It was fortunate that he procured flowers this time, as we had not seen them before. I will describe the plants in detail, as it may be useful to the future student of this branch of botany.

The plant with the double flower and two whorls of three leaves each is 19.5 cm. in height. It is 13 cm. to the first node, where there are three withered bases of leaves, which were evidently eaten by insects. The internode above this is 1.7 cm. long, and at the second node there are three, broadly ovate, taper-pointed, petioled leaves. The blades of these leaves are respectively 6.7 cm., 6.5 cm. and 5.5 cm. in length, and the petioles 8 mm., 10 mm. and 15 mm. in length. Above this node is the peduncle, 4.2 cm. long, crowned by the flower. The three sepals are broadly ovate, taper-pointed, sessile, green, and are respectively 6 cm., 5 cm. and 5.5 cm. in length. There are six petals, ovate to obovate, wavy margined, with very abrupt tapering points, and from 3 cm. to 4 cm. in length. The color of four of the petals is normal, i. e., white with purple stripes at the base, but the remaining two petals, which are in the outer row, have, beside the usual coloration, one, a broad, dark green band occupying the center of the petal from base to tip, and the other, a narrow, light green line running down the center the entire length, on one side of which near the tip is a dash of light green. There are three normal stamens opposite the three outer petals. The pistil consists of a three-lobed ovary, two normal styles and one bent and deformed. On one side of the ovary is a rudimentary stamen, the filament and half the anther contiguous with it along a narrow ridge, which extends perpendicularly the length of the ovary. The anther is destitute of pollen grains. The ovary itself, as well as the twisted character of the interior shows, is two-celled with axile placentae and many ovules.

The second plant has three whorls of three leaves each. It is 22 cm. high and 13 cm. to the first node where there are three broadly ovate, taper-pointed, petioled leaves with the blades 8 cm. and the petioles 2.5 cm., 3 cm. and 3 cm. in length. The first internode is 5.5 cm. long, and at the second node are three broadly ovate, taper-

pointed, petioled leaves, with the blades 7 cm., 7 cm. and 6 cm., and the petioles all 5 mm. in length. The second internode is 2 cm. long and at the third node are three ovate, taper-pointed, sessile leaves, two with a single lobe on one side, a little nearer the base than apex, the sinus pointing to the base of the leaf, and giving the effect in a general way of the single-lobed form of leaf of our common Sassafras (*Sassafras variifolium* (Salisb.) Ktze.), while the third leaf has a notch in the same position, showing an approach to the same kind of lobe. The leaves are 6.2 cm., 6.5 cm. and 5.7 cm. in length. Above this node is the peduncle, 1 cm. long, surmounted by the flower, which is normal as to the petals and stamens. The sepals are three in number, green, ovate, taper-pointed, sessile, 4.5 cm. in length and 2 cm. in width. The ovary is normal as to its exterior, but is one-celled with three parietal placentae and numerous ovules.

The plants taken from this same station in 1907 and 1908 by Mr. DeMeritte exhibited in general the plan of three, excepting one which was growing about two meters from the others and showed the plan of three and of four in its various parts. The persistency of these forms now for three seasons is significant and would seem to indicate a normal condition of abnormality in this particular locality.

An interesting *Trillium erectum* L. came to my notice on May 30, 1909, and I examined it in a fresh state. A party of us were driving on that day through the Glen Road at the base of the White Mountains in New Hampshire. The sides of the way were lined with this handsome Trillium in full flower, the large rhombic leaves and the deep maroon petals making a beautiful display. We collected a large bunch, and in the evening I examined each plant carefully and found one case of teratology. In all points not mentioned below, such as size and shape of leaves, etc., the plant is normal. There is a single whorl of four leaves. The sepals are five in number, green with an edging of maroon, two of them in addition streaked with maroon. There are four petals alternating with the sepals and leaving one vacant place where there is absolutely no evidence that a fifth petal was ever present, the two adjoining petals being contiguous at the base. There are eight stamens, four opposite, and four alternating with the petals. One of the latter stamens is double, the anthers separate for three fifths of the way from the apex, the remaining two fifths, as well as the filaments, united. The ovary is eight-winged, one-celled, with four parietal placentae, each placenta attached to the wall between

two ridges, and two ridges being between two adjoining placentae. The attachment of the placentae is opposite the petals, and the ovules are numerous.

All the specimens above described are in my herbarium.

Cambridge, Massachusetts.

LONICERA PROLIFERA AND L. FLAVIDA.

Alfred Rehder.

In the new edition of Gray's Manual the name *Lonicera Sullivantii* is adopted as the valid name for that species, but a strict application of the Vienna code of nomenclature will necessitate a change, as the oldest valid specific name for the species is *Caprifolium proliferum* Kirchner, antedating Gray's name by almost twenty years. Kirchner's description in this case is rather good and there can be no doubt about the species he had in mind. Moreover I have seen herbarium specimens under the name of *Caprifolium proliferum* and *L. prolifera* collected in European gardens in the sixties, two of them preserved in the herbarium of the St. Louis Botanic Garden, which represent the same species. The combination *Lonicera prolifera* is not entirely new, for it was published, though without any description, as far back as 1840. The authority cited "Booth Cat." corresponds with the information Kirchner gives who says that he obtained the species from the nurseries at Flottbeck; Booth's nursery at Flottbeck was at that time one of the best known in Germany and famous for its collections of rare and new plants. This shows that the *Lonicera* in question has been in cultivation in Europe for at least seventy years and has been considered a distinct species by German horticulturists. I append here the synonymy of the species omitting Rafinesque's *Lonicera rupestris* and *L. reticulata* quoted in my Synopsis of the genus *Lonicera* with a query under *L. Sullivantii*; these two species being very doubtful may not belong to *Lonicera* at all.

Lonicera prolifera (Kirchner) n. comb.— [*L. prolifera* Booth Cat. ex Heynhold, Nomencl. Bot. Hort. I. 476. 1840, nomen nudum. *L. spec. nov.* Sullivant, Cat. Plant. Columbus 29, 57. 1840.] *L.*

flava β Torrey & Gray, Fl. N. Am. II. 6. 1841. *L. parviflora β Sullivantii* Wood, Classb. Bot. ed. II. 298. 1847. *L. flava* Gray, Man. Bot. 171. 1848, in part. *Caprifolium proliferum* Kirchner in Petzold & Kirchner, Arb. Muscav. 426. 1864. *L. Sullivantii* Gray, Proceed. Am. Acad. XIX. 76. 1883. *Caprifolium Sullivantii* Kuntze, Rev. Gen. Pl. I, 274. 1891. *L. sempervirens* var. *Sullivantii* Mouillefert, Arb. Arbriss. II. 897. 1896.

It may seem not quite correct to call *L. prolifera* a new combination, as this very name had been published already in 1840, but then it was not accompanied by a description nor by a reference to an earlier description and therefore can as a nomen nudum not be considered a valid name. The specific name first became valid in 1864 with *Caprifolium proliferum* which is accompanied by a sufficient description.

Another American *Lonicera* which has to receive a new name is *Lonicera flavescens* Small, Fl. Southeast. U. S. 1126 (1903), as there exists an older homonym in *L. flavescens* Dippel, Gartenfl. XXXVII.7 (1888). A new name was proposed soon after the publication of the younger homonym by Professor T. D. A. Cockerell in a letter preserved in the herbarium of the New York Botanical Garden with the type specimen and as it has not yet been published it may be put on record here.

Lonicera flavida Cockerell in litt., nom. nov.— *L. flavescens* Small, Fl. Southeast. U. S. 1126. 1903, not Dippel. *L. flavida* is closely related to *L. flava* Sims and intermediate between that species and *L. prolifera* (Kirchn.) Rehd. From *L. flava* it differs chiefly in the paler color of the corolla, the shorter tube with the throat pubescent inside and the acute and not chartaceous-margined leaves, while from *L. prolifera* it is easily distinguished by its acute, thin leaves, not glaucous above, the slenderer and longer corolla-tube and the shorter inflorescence. The species seems to be rather local and is known only from a few localities in Tennessee and Kentucky; the type is from the Cumberland Mountain in Franklin Co., Tennessee.

Arnold Arboretum.

NOTES ON THE FLORA OF FRANKLIN COUNTY, MASSACHUSETTS.

Emile F. Williams.

I spent June 17th and 18th, 1910, in Greenfield, Massachusetts, and as I collected there and in the neighborhood several plants of much interest, I was urged by the ever diligent editors of Rhodora to put them on record.

The morning of the 17th was devoted to the bold ridge to the east of the town, known locally as Rocky Mountain. Much of this ridge is brown sandstone, and near the southerly end there is an outcrop of basaltic rock which is of such interest to geologists, that the inroads of a stone crusher near by were diverted in another direction. Immediately as we entered the woods at the foot of the slope, we were greeted by the delicate elusive purple racemes of *Liparis liliifolia*, an auspicious introduction to the flora of the ridge. A short scramble brought us to the summit which was literally covered by a *Vaccinium* that has hitherto always escaped me, until I began to think it very rare indeed, *V. stamineum*, the deerberry or Squaw huckleberry. Its racemes are quite loose and, unlike the flowers of most other species of the genus, the corollas are open campanulate and hang downwards on slender pedicels, like graceful little white bells with burnt orange stamens for clappers. On the edge of the cliffs, beautiful tufts of *Woodsia ilvensis* filled those cracks in the rock which were not appropriated by the harebells and the fruiting clumps of Columbine. A little further south the top of the cliff was covered by great patches of the by no means common *Arenaria stricta*. I have it from a few stations in Vermont and only one in Connecticut. Near by we came upon a thriving colony of the beautiful *Asclepias quadrifolia*, and *Arabis Drummondi* filled the cracks of a great ledge in the burning sunshine. The view from the southern end of the ridge called Sachem's Head was superb. Below us spread the town with the Green river sluggishly flowing to its junction with the Deerfield river. To our left stretched many miles of the Connecticut river and its fertile valley. Before us was extended the Deerfield valley with the picturesque village peeping out between the tall trees, and in the foreground Pine Hill, a richly wooded island in the Deerfield meadows, reminded us of

our well beloved Oak Island in the Revere marshes. The distant view displayed a noble panorama of hills and mountains as far as the eye could see.

It had rained heavily in the early morning and the bushes were very wet, so we were unable to explore the cliffs where grows the beautiful *Clematis verticillaris*. I have a specimen of this plant collected here in June, 1897, and I was informed that it is not infrequent on the steep rocky slides below the summit.

The afternoon was devoted to historical exploration in old Deerfield, and in the old Cemetery we came again upon *Vaccinium stamineum*, unceremoniously taking possession of the graves of early settlers, so old that they are no longer cared for and the weeds and brambles are thick amongst them. Near the cemetery is the station for the very rare *Arisaema Dracontium*, the green dragon. I have a specimen in my herbarium dated June 3d, 1896, which came from a garden in Deerfield where a bulb collected here some years before had been propagated and throve for many years. It has not been seen for some time, but then, nobody has looked for it. I hated to leave without investigation but as our time was limited and as the meadow was very large and very wet I reluctantly turned back. The only other station I know of in New England for this rare plant is at Weybridge, Vermont, where I collected it in 1908. It was abundant there at that time. It is said to be found locally in Connecticut.

On the 18th we started early for the valley of the Green river. The route lay at first through the Greenfield meadows and here I collected in a field an old acquaintance of New Hampshire, *Camelina microcarpa*. After driving some miles through the fertile fields and prosperous looking farms of the meadows, we entered the woods. We were now in Coleraine and the scenery rapidly grew wilder. The clear shallow river about one hundred feet wide, from this point northwards flows swiftly between steep hillsides covered with a luxuriant growth, deciduous trees predominating. There is room in this narrow valley only for the river and the road, which indeed in many places is held up by walls built up from the river bed. The many bars and alluvial thickets hold out a tempting invitation to be searched, and at every bend of the river beautiful views are revealed, enchanting vistas of stream and forest, moss covered ledges and fairy brooks plunging down the hillsides under dimly lit arches of verdure. It is New England's hill country at its best and reminded us of river scenery we had

explored, in wild and remote regions, where the hand of man has not yet despoiled nature of her glory.

Our principal objective in penetrating this lovely wilderness was to visit a station for *Waldsteinia fragarioides* recently discovered by my cousin, Mrs. George W. Thacher, a botanist of large experience, who accompanied me. An agreeable surprise was held back by her, and when we alighted at her direction, we found ourselves before a large and thriving colony of *Equisetum scirpoides*, the first one I had seen in Massachusetts. This *Equisetum* is fairly frequent in northern Maine and northwards and is occasionally found in Vermont, the Berkshires and western Connecticut. It is however not common, and I was very much pleased to renew my acquaintance with it. The *Waldsteinia* was close by and was growing rather sparingly on a rich bank, in partial shade. It was past flowering, but I knew it at once. I learn that the Grey Herbarium contains but one sheet of the *Waldsteinia* from New England, collected at Hanover, New Hampshire, in 1846. The herbarium of the New England Botanical Club has two,—one from Hanover collected by Dr. George G. Kennedy, and one from Pownal, Vermont collected by Fred G. Floyd. Mr. Walter Deane who kindly furnished me with the above data has a specimen from Connecticut in his herbarium. I have myself collected *Waldsteinia* only once before, at Brandon, Vermont, in company with Dr. Kennedy in May, 1908. I have it also in my herbarium from Lebanon, New Hampshire (G. G. Kennedy) Middlebury, Vermont (Dr. Ezra Brainerd) and Rutland, Vermont (W. W. Eggleston). While this plant may be fairly common in Vermont especially in the Champlain valley, it appears to have been seldom reported from other New England localities Along the road grew in rich abundance such plants as *Mitella diphylla, Tiarella cordifolia, Cystopteris bulbifera, Onoclea Struthiopteris, Carex sparganioides, Luzula saltuensis,* all dear to the heart of the botanist, and a hurried inspection of a short stretch of river beach rewarded us with *Spiranthes lucida, Habenaria hyperborea,* and most unexpected in this wild spot, *Lithospermum officinale.* The valley of the Green river is easily reached from Greenfield and I have no doubt from the short visit I made to it, that it would well repay a systematic investigation of its flora.

Cambridge, Massachusetts.

VERNONIA GEORGIANA, A NEW SPECIES RELATED TO V. OLIGOPHYLLA.

H. H. Bartlett.

Botanists in the southeastern States must have often observed the close similarity which *Elephantopus tomentosus* bears to *Vernonia oligophylla* when both are in the rosette stage. Indeed, at the outset of my own collecting in Georgia, I failed to distinguish the two plants until I had seen both in flower. In the pine barrens of McDuffie County there are three species of *Elephantopus*, — *E. carolinianus*, with the leaves all ovate and all alike, *E. nudatus* with lanceolate leaves forming a basal rosette, and much reduced or bracteiform cauline leaves, and *E. tomentosus* with a basal rosette of ovate or oblong leaves and the stem usually scapiform. The close similarity of *Vernonia oligophylla* to *Elephantopus tomentosus* had struck me so forcibly that when I found a third kind of rosette in the pine barrens, with narrowly lanceolate, acute leaves, I passed it by as *Elephantopus nudatus*. Until last summer, I did not find this third rosette in flower, and then, to my surprise and pleasure, it proved to be a species of *Vernonia*, very closely allied to *V. oligophylla*. In its rosette of large basal leaves *Vernonia oligophylla* has heretofore been held unique among our iron-weeds. This character it holds in common with the newly discovered plant.

On account of the well-known tendency of the *Vernoniae* to hybridize, it occurred to me that I might have found a hybrid between *V. oligophylla* and some other species. The idea seemed the more plausible because one of my *Vernoniae* from the same region is thought by Dr. Gleason to be a hybrid between two such diverse species as *V. noveboracensis* and *V. angustifolia*. *Vernonia angustifolia* is sometimes associated with *Vernonia oligophylla*, although as a general rule it grows in much drier soil. I was unable to see that there was any clear evidence of the problematic plant, described below as *Vernonia georgiana*, having had a hybrid origin from these two species. In *Vernonia angustifolia* the pappus is tawny, in *V. oligophylla* it is whitish. In a hybrid we should expect the color character of the former species to be dominant, whereas in *Vernonia georgiana* the pappus is exactly the same as in *V. oligophylla*.

Vernonia georgiana sp. nov. Herba erecta, simplex vel parte superiore ramosa, 2–10 dm. alta. Caulis vel viridis vel purpureus, striatus, puberulus. Folia dimorpha; inferiora 7–8 lanceolata, 5–15 cm. longa, 1–2 cm. lata, sessilia, basi valde angustata, acuta vel obtusa, denticulata, supra scabra, subtus puberula; caulinia angustiora linearia, superne bracteiforma. Inflorescentia laxa, capitulis campanulatis pedicellatis. Involucrum ca. 28–florum, 6–7 mm. altum, squamis glabris vel obscurissime ciliatis, interioribus appressis, exterioribus quam interioribus multo brevioribus, apice paulum patentibus. Achenia sulcata pubescentia, pappi setulis pallide stramineis.—Type, *Bartlett 1730*, pine barrens of the fall line sand-hills, vicinity of Thomson, McDuffie Co., Georgia, 10 Aug. 1909.

Vernonia georgiana is easily distinguished from *V. oligophylla*, with which it grows, by the much narrower leaves, fewer flowered involucres (flowers about 28 in *V. georgiana*, more than 40 in *V. oligophylla*) and by the less spreading and much shorter outer involucral scales. It is known to me only from the one locality.

Bureau of Plant Industry, Dept. of Agriculture,
Washington, D.C.

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WOODY PLANTS OF BROOKLIN, MAINE.

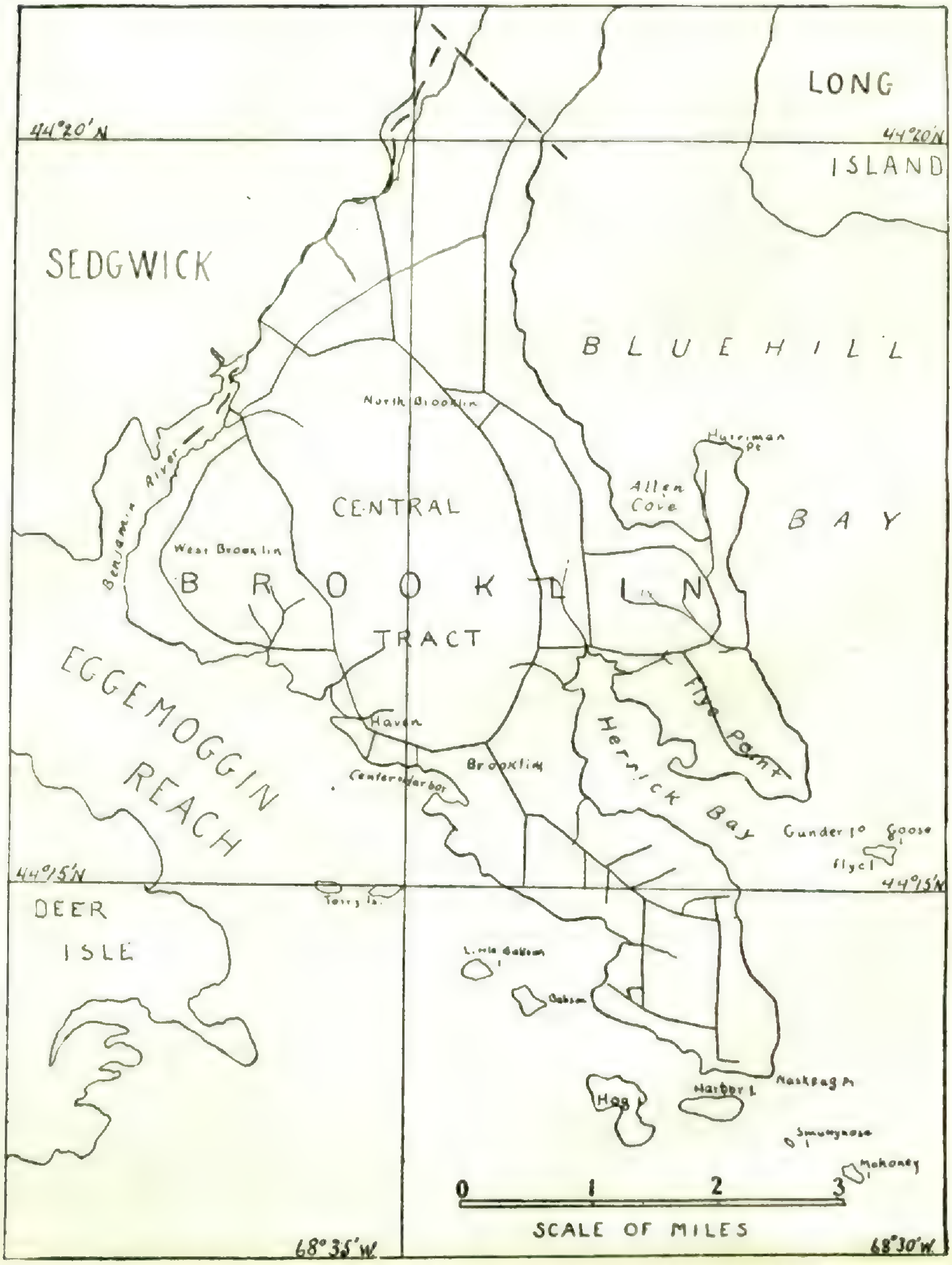
ARTHUR H. GRAVES.

THE following paper presents a record of collections of woody plants made by the writer during the month of August, 1908, in the township of Brooklin, Maine. Although the list is fairly complete and is based on a comprehensive survey of the township, a more thorough investigation would probably disclose a few additional species and new stations for those species already observed.

As far as can be ascertained there are no published records of collections of plants made in the township of Brooklin. The neighboring island of Mt. Desert, however, has been well explored, as the admirable flora of Mt. Desert Island by Rand and Redfield [1] testifies.

The township of Brooklin covers an area of about sixteen square miles, and is located on a point of land extending in a southeasterly direction, which marks the extreme eastern limit of Penobscot Bay. On its eastern side it is separated from Mt. Desert Island by Bluehill Bay, and to the west lie Eggemoggin Reach and Deer Isle. The whole region is fairly low, the highest point being at the north, where an altitude of about 200 feet occurs. Northwest of this high point Brooklin is divided from the adjoining town of Sedgwick by the Benjamin River, which is said at times of high tide to connect by way of Salt Pond with Bluehill Bay. If this is the case, the town is practically an island. In the central part of the township lies a plateau of considerable extent, which is entirely uninhabited and

[1] Rand, E. L., and Redfield, J. H.; Flora of Mount Desert Island, Maine. A preliminary catalogue of the plants growing on Mount Desert and the adjacent islands. Cambridge. 1894.



MAP OF THE TOWNSHIP OF BROOKLIN, MAINE

contains a number of interesting bogs interspersed with stretches of coniferous forests. This region I have designated the "Central Tract."

To the west and north of this tract are situated the settlements of West Brooklin and North Brooklin, while immediately south lies the most thickly settled part of the town, known as Brooklin Center. Further to the south the land is divided by Herrick Bay into two peninsulas, called Naskeag Point on the west, and Flye Point on the east. These two peninsulas, as well as the other land not included in the Central Tract, are for the most part thickly wooded, mainly with coniferous species, and often down to the water's edge. They contain, here and there, short stretches of bog.

Specimens of all plants collected are preserved and deposited in the Eaton Herbarium of Yale University. The nomenclature used in the list is that of the seventh edition of Gray's Manual of Botany.

In the preparation of the list I am indebted to the following for their kind assistance: Professor M. L. Fernald, Professor N. L. Britton, Mr. W. H. Blanchard, and Dr. George N. Best. I desire to thank also Mr. E. L. Rand and Professor A. W. Evans for their valuable suggestions and criticism.

Since the region studied is so near to the island of Mt. Desert, about five miles distant, it has seemed to me that a comparison of the woody plants recorded for Mt. Desert in Rand and Redfield's Flora, with those in my list would be interesting. Of the 100 species and varieties collected in Brooklin, thirteen are not recorded in the Flora of Mt. Desert. They are as follows:

1. *Picea rubra* (DuRoi) Dietr. This species was not distinguished in the sixth edition of Gray's Manual, to which Rand and Redfield's Flora conforms, it being included under *Picea nigra* Link. Mr. Rand informs me that it is common on Mt. Desert Island.

2. *Salix nigra* Marsh. Only one tree of this was observed, near Brooklin Center, but this was apparently native.

3. *Salix alba* L. var. *vitellina* (L.) Koch.

4. *Populus alba* L. Several trees have sprung up at Brooklin Center, evidently descendants of much older trees which are planted out nearby.

5. *Populus candicans* Ait.

6. *Alnus mollis* Fernald. Included in the *Alnus viridis* (Chaix.) DC. of the Mt. Desert Flora, according to statement by Mr. Rand.

7. *Ribes nigrum* L.

8. *Sorbaria sorbifolia* (L.) A. Br. This plant was well established at Mount Ephraim Cemetery in North Brooklin, where presumably, it was originally planted. It is a native of Northern Asia.

9. *Amelanchier oligocarpa* (Michx.) Roem. Identified by Mr. W. H. Blanchard as probably this species.

10. *Rosa spinosissima* L.

11. *Prunus avium* L.

12. *Vaccinium pennsylvanicum* Lam. var. *nigrum* Wood. This variety was not distinguished in the sixth edition of Gray's Manual. Its presence, however, was indicated as a form of *Vaccinium pennsylvanicum* Lam. in the Mt. Desert Flora, and has since been definitely recorded in Rhodora.[1]

13. *Lonicera sempervirens* L.

It will be seen from the above that the additions to the woody plants recorded in the Mt. Desert Flora consist for the most part of naturalized species or of species which were not recognized in the sixth edition of Gray's Manual.

TAXACEAE.

TAXUS.

T. canadensis Marsh. American Yew. Rare. Deep moist woods in Central Tract, and in a similar station in the woods between Brooklin Center and Herrick Bay.

PINACEAE.

PINUS.

P. Strobus L. White Pine. Rather common, especially in northern portion of Central Tract.

P. resinosa Ait. Red Pine. Rare. Northwest part of Central Tract near road from Brooklin Center to Sedgwick. (*Owen L. Flye*).

P. rigida Mill. Pitch Pine. Rather rare, but locally abundant in northwest part of Central Tract. One station also at Flye Point. (*C. L. Parker.*)

[1] Rhodora **10**: 145. 1908.

LARIX.

L. laricina (Du Roi) Koch. AMERICAN LARCH. TAMARACK. Common in swampy soil.

PICEA.

P. canadensis (Mill.) BSP. WHITE OR CAT SPRUCE. Common. This and the following species, together with the Balsam Fir, comprise the greater part of the coniferous forests of the township.

P. rubra (Du Roi) Dietr. RED SPRUCE. Common.

P. mariana (Mill.) BSP. BLACK SPRUCE. Common in bogs.

ABIES.

A. balsamea (L.) Mill. BALSAM FIR. Common.

TSUGA.

T. canadensis (L.) Carr. HEMLOCK. Rare. One tree observed at Flye Point.

THUJA.

T. occidentalis L. ARBOR VITAE. Common.

JUNIPERUS.

J. communis L. var. **depressa** Pursh. LOW JUNIPER. Common. The form here is close to var. **montana** Ait.

J. horizontalis Moench. Rare. One station at Flye Point.

SALICACEAE.

SALIX.

S. nigra Marsh. BLACK WILLOW. Rare. Near Brooklin Center.

S. lucida Muhl. SHINING WILLOW. Rare. Roadside, North Brooklin.

S. ALBA L. var. VITELLINA (L.) Koch. WHITE WILLOW. Naturalized at Flye Point.

S. cordata Muhl. HEART-LEAVED WILLOW. Rare. West Brooklin.

S. discolor Muhl. GLAUCOUS WILLOW. Common.

S. humilis Marsh. Prairie Willow. Rather common.

S. rostrata Richards. Common.

POPULUS.

P. alba L. White Poplar. Silver-leaved Poplar. Abele. Naturalized at Brooklin Center.

P. tremuloides Michx. American Aspen. Rather common.

P. grandidentata Michx. Large-toothed Aspen. Rather common.

P. balsamifera L. Balsam Poplar. Several trees planted in various parts of the township, and these have reproduced by seedlings.

P. candicans Ait. Balm of Gilead. Apparently introduced, but naturalized.

MYRICACEAE.

MYRICA.

M. Gale L. Sweet Gale. Common in wet places. Harriman Point; Central Tract.

M. carolinensis Mill. Bayberry. Common.

M. asplenifolia L. Sweet Fern. Common.

BETULACEAE.

BETULA.

B. populifolia Marsh. White or Gray Birch. Common.

B. alba L. var. **papyrifera** (Marsh.) Spach. Paper or White Birch. Common.

ALNUS.

A. mollis Fernald. Downy Green Alder. Common, especially near the coast. The *Alnus viridis* of the Mt. Desert Flora probably includes this species.

A. incana (L.) Moench. Speckled or Hoary Alder.

FAGACEAE.

FAGUS.

F. grandifolia Ehrh. Beech. Rare. Harriman Point.

QUERCUS.

Q. rubra L. Red Oak. Rare. Several trees at Harriman Point. One tree at Flye Point.

URTICACEAE.

ULMUS.

U. americana L. American Elm. Rare. Brooklin Center.

SAXIFRAGACEAE.

RIBES.

R. oxyacanthoides L. Smooth Gooseberry. Common.

R. nigrum L. Black Currant. Naturalized at old house site, Harriman Point.

R. prostratum L'Hér. Skunk Currant. Locally abundant in moist woods. Flye Point; Central Tract.

ROSACEAE.

SPIRAEA.

S. tomentosa L. Hardhack. Common.

S. latifolia Borkh. Meadow-sweet. Common.

SORBARIA.

S. sorbifolia (L.) A. Br. Mountain Ash Spiraea. Naturalized at Mount Ephraim cemetery, North Brooklin.

PYRUS.

P. Malus L. Apple. Common.

P. arbutifolia (L.) L. f. Red Chokeberry. Rather common.

P. melanocarpa (Michx.) Willd. Black Chokeberry. Rather common.

P. americana (Marsh.) DC. American Mountain Ash. Rather common.

AMELANCHIER.

A. canadensis (L.) Medic. Shad Bush. Service Berry. Common.

A. oligocarpa (Michx.) Roem. Rather common. Flye Point. Mr. W. H. Blanchard, to whom I have referred the specimens, states that it is probably this species.

CRATAEGUS.

C. macracantha Lodd. Hawthorn. Common.

POTENTILLA.

P. tridentata Ait. Three-toothed Cinquefoil. Locally abundant in the Central Tract.

RUBUS.

R. idaeus (L.) var. **aculeatissimus** (C. A. Mey.) Regel & Tiling. Wild Red Raspberry. Common in fields.

R. allegheniensis Porter. Mountain Blackberry. Common.

R. canadensis L. Common.

R. hispidus L. Running Swamp Blackberry. Common. Besides these species of Rubus one or two doubtful forms were collected.

ROSA.

R. spinosissima L. Scotch Rose. Naturalized at Flye Point and at Harriman Point.

R. cinnamomea L. Cinnamon Rose. Naturalized at Mount Ephraim Cemetery, North Brooklin.

R. rubiginosa L. Sweetbrier. Naturalized at Naskeag Point.

R. virginiana Mill. Glossy Rose. Common.

R. humilis Marsh. Low or Pasture Rose. Rather common. Flye Point; Harriman Point.

PRUNUS.

P. serotina Ehrh. Wild Black Cherry. Rare. One station at North Brooklin, where several trees were observed.

P. virginiana L. CHOKE CHERRY. Rather common in thickets and along fences.

P. pennsylvanica L. f. WILD RED CHERRY. BIRD CHERRY. Rather common.

P. AVIUM L. SWEET CHERRY. Naturalized near roadside about one half mile north of Haven.

LEGUMINOSAE.

ROBINIA.

R. Pseudo-Acacia L. COMMON LOCUST. FALSE ACACIA. Established at Mount Ephraim Cemetery at North Brooklin, and on roadside in North Brooklin.

R. viscosa Vent. CLAMMY LOCUST. Established near roadside at Flye Point.

EMPETRACEAE.

EMPETRUM.

E. nigrum L. BLACK CROWBERRY. Rare. Rocky coast at Harriman Point.

COREMA.

C. Conradii Torr. CONRAD'S CROWBERRY. BROOM CROWBERRY. Rare. Bog in Central Tract.

ANACARDIACEAE.

RHUS.

R. typhina L. STAGHORN SUMACH. Rather common. West Brooklin; Flye Point.

R. Toxicodendron L. POISON IVY. POISON OAK. Rare. North Brooklin.

AQUIFOLIACEAE.

ILEX.

I. verticillata (L.) Gray. BLACK ALDER. WINTERBERRY. var. **tenuifolia** (Torr.) Wats. Common. Somewhat variable; some plants perhaps resembling more closely the type form.

NEMOPANTHUS.

N. mucronata (L.) Trel. Mountain Holly. Common in woods.

ACERACEAE.

ACER.

A. pennsylvanicum L. Striped Maple. Moosewood. Rather common.

A. spicatum Lam. Mountain Maple. Rather common.

A. saccharum Marsh. Sugar or Rock Maple. Rare. A few trees seen in woods about one half mile north of Haven Post Office.

A. rubrum L. Red or Swamp Maple. Common.

VITACEAE.

PSEDERA.

P. quinquefolia (L.) Greene. Virginia Creeper. Woodbine. Evidently introduced, but established at old house site, Harriman Point.

CORNACEAE.

CORNUS.

C. alternifolia L. f. Alternate-leaved Dogwood. Rare. Southern shores of Herrick Bay.

ERICACEAE.

LEDUM.

L. groenlandicum Oeder. Labrador Tea. Rather common. Bog at Harriman Point; bogs in Central Tract.

RHODODENDRON.

R. canadense (L.) BSP. Rhodora. Common.

KALMIA.

K. angustifolia L. Sheep Laurel. Lambkill. Rather common in fields and bogs.

CHAMAEDAPHNE.

C. calyculata (L.) Moench. Leather Leaf. Common in bogs.

GAULTHERIA.

G. procumbens L. Teaberry. Checkerberry. Creeping Wintergreen. Locally abundant in woods near Brooklin Center, and in Central Tract.

CHIOGENES.

C. hispidula (L.) T. & G. Moxie Plum. Capillaire. Creeping Snowberry. Common in bogs.

GAYLUSSACIA.

G. baccata (Wang.) C. Koch. Black Huckleberry. Locally abundant. Harriman Point; northern part of Central Tract.

VACCINIUM.

V. pennsylvanicum Lam. Low Sweet Blueberry. Early Sweet Blueberry. Common.

V. pennsylvanicum Lam. var. **nigrum** Wood. Low Black Blueberry. A few plants at Flye Point.

V. canadense Kalm. Sour-top or Velvet-leaf Blueberry. Common.

V. corymbosum L. High or Swamp Blueberry. Rather rare. Swampy woods near north end of Herrick Bay; also in Central Tract.

V. Vitis-Idaea L. var. **minus** Lodd. Mountain or Rock Cranberry. Common.

V. Oxycoccos L. Small Cranberry. Rather rare. Bog at Harriman Point; Flye Point.

V. macrocarpon Ait. Large or American Cranberry. Common.

OLEACEAE.

FRAXINUS.

F. americana L. White Ash. Rather rare. Naskeag Point; Central Tract.

F. nigra Marsh. Black Ash. Rare. A few specimens observed in wet places in the Central Tract.

SYRINGA.

S. vulgaris L. Common Lilac. Naturalized at old house site, Harriman Point.

CAPRIFOLIACEAE.

DIERVILLA.

D. Lonicera Mill. Bush Honeysuckle. Locally abundant in various parts of the township.

LONICERA.

L. canadensis Marsh. American Fly Honeysuckle. Rare. Woods near Flye Point.

L. sempervirens L. Trumpet Honeysuckle. Evidently established near roadside, Flye point.

VIBURNUM.

V. alnifolium Marsh. Hobble-bush. Witch Hobble. Moose-wood. Rather common. South shores of Herrick Bay; woods east of Brooklin Center, &c.

V. cassinoides L. Withe-rod. Wild Raisin. Common everywhere in thickets and borders of woods.

SAMBUCUS.

S. canadensis L. Common Elder. Rather rare. The following is the commoner species.

S. racemosa L. Red-berried Elder. Rather common.

Yale University.

NOTES FROM THE PHAENOGAMIC HERBARIUM OF THE NEW ENGLAND BOTANICAL CLUB,—I.

M. L. Fernald.

Under this general heading it is proposed to publish from time to time notes, suggested primarily by specimens in the Club Herbarium, which may be of interest to members of the Club and others who are working upon the flora of New England. As material accumulates and becomes organized in the Herbarium, many gaps in our knowledge of detailed distribution become obvious and, fortunately, many specimens drift in or become accessible which add very materially to our information about the ranges of the less generally distributed species. The present instalment of notes may appropriately bear the subtitle.

Some Local Plants of Eastern and Central Massachusetts.

Bromus purgans L., often confused with *B. ciliatus* and not ordinarily recognized in the flora of eastern Massachusetts, is represented in the Club Herbarium by specimens from several stations near Boston: Malden, July 13, 1879 (*H. A. Young*), July 24, 1879 (*E. & C. E. Faxon*); Maplewood, July, 1880 (*R. Frohock*); rocky woods north of Cascade, Middlesex Fells Reservation, Melrose, June 28, 1894 (*W. P. Rich*); Warren Farm, Brookline, July 21, 1897 (*J. R. Churchill*).

Bromus altissimus Pursh, another relative of *B. ciliatus* which is not generally recognized from the eastern half of Massachusetts, is represented in the Club Herbarium by specimens from Ayer, August 13, 1882 (*W. H. Manning*) and Princeton, August 9, 1894 (*J. F. Collins*).

Bromus Kalmii Gray has not been recorded, apparently, as far east as Worcester County, Massachusetts. There is an excellent specimen in the Club Herbarium collected at Sturbridge, July 23, 1899, by Dr. R. M. Harper.

Lolium temulentum L., as represented in the Club Herbarium, was collected on dumping grounds of Lowell, Charlestown, Boston, and South Boston from 1878 to 1884; and the awnless var. leptochaeton A. Br. in "Boston or vic[inity], 1882." Have they persisted?

Elymus virginicus L., var. submuticus Hook. There are three sheets of specimens of this very pronounced variety in the Club Herbarium, all collected in Revere by C. E. Perkins (August 13, 1880, and August 11, 1881). The plant is not known from elsewhere in New England and is possibly an introduction from the West, but the writer is inclined to class it with other species, more common from western New England westward, which are well known from Oak Island and other sections of Revere (see note under *Pedicularis lanceolatus*).

Scirpus heterochaetus Chase is known in New England outside the Champlain Valley only in eastern Massachusetts. Mr. F. F. Forbes has a station of it on banks of the Charles River at Cow Bay, Dedham, and the writer has seen it at the margin of the Concord River near Carlisle Bridge in Bedford.

Scirpus fluviatilis (Torr.) Gray, another species not commonly seen east of the Connecticut River, was collected by Mr. W. H. Manning at Brighton (on the Charles River), June 30, 1879. Does it still occur there?

Rynchospora alba (L.) Vahl, var. macra Clarke, a very large extreme of the species, more abundant on the coastal plain from New Jersey to Florida, is known to the writer from two stations in eastern Massachusetts: Fresh Pond, Cambridge, August 20, 1853 (*Wm. Boott*) and the wetter portions of the bog, Round Pond, Tewksbury, September 18, 1909 (*M. L. Fernald & A. J. Eames*). The Tewksbury specimens are nearly 8 dm. high, and their principal inflorescences 2 cm. broad.

Carex aenea Fernald, not included in Mr. Joseph Jackson's recent (1909) Flora of Worcester County, was collected by Wm. Boott on Mt. Wachusett, June 27, 1878.

Carex trisperma Dewey, var. Billingsii Knight. If one may judge by the representation in the Club Herbarium, this recently recognized setaceous-leaved variety is about as common in northeastern Massachusetts as the typical broader-leaved form of the species; the latter being represented by eight specimens, the former by seven: from Lynnfield, Tewksbury, Littleton, Wakefield and Melrose, all north of Boston. But, since the variety extends from the sandy bogs of central Newfoundland to the pine barrens of New Jersey, it should be expected, also, in the cranberry bogs of southeastern Massachusetts, a region from which we have altogether too little herbarium material.

Carex crinita Lam., var. simulans Fernald. A sheet of specimens collected at Ashburnham, June 18, 1896, by Mr. Sydney Harris, represents an extreme southern station for this comparatively northern variety, which is otherwise unrepresented in the Herbarium from south of the White Mountains.

Carex aquatilis Wahlenb. Well developed fruiting tips from Georgetown, collected by the late Mrs. C. N. S. Horner, are the only specimens known to the writer from eastern Massachusetts. *C. aquatilis* is thus added to that list of very interesting species, characteristic of calcareous western New England but ordinarily unknown from eastern Massachusetts, which have long been known from isolated stations in Georgetown, Boxford, Lynnfield, and neighboring towns; a region of more numerous calcareous outcrops than other portions of eastern Massachusetts.[1] This localized flora includes such species as *Carex livida, Spiranthes lucida, Salix candida, Caulophyllum thalictroides, Parnassia caroliniana, Potentilla fruticosa, Ceanothus ovatus, Veronica Anagallis-aquatica, Senecio obovatus,* &c.

Carex torta Boott. Ashburnham, May 24, 1896 (*Sydney Harris*). Southbridge is the only station recorded in Jackson's Flora of Worcester County.

Carex virescens Muhl., var. Swanii Fernald, not included in Jackson's Flora of Worcester County, was collected on the east slope of Mt. Wachusett, alt. 1400 ft., July 15, 1893, by Professor J. F. Collins.

Carex aestivalis M. A. Curtis. It is not generally known, apparently, that this attractive species (like small-fruited *C. gracillima* with pubescent sheaths) was collected in eastern Massachusetts by William Boott. Beautiful material, labelled by Boott himself and properly named, is in the Gray Herbarium from Lexington, collected July 2, 1876. Is the station now "improved" away?

Carex Willdenowii Schkuhr is another species not generally known to botanists of eastern Massachusetts. It was included in Dame & Collins's Middlesex Flora from Melrose; and specimens labeled by William Boott, "Malden [Melrose], above the Waterfall, on the west side of a path, June 11, 1863," as well as earlier material from Boott, collected June, 1853, are in the Gray Herbarium. In the Club Herbarium is also a characteristic specimen from "dry woods, Ponkapog, Randolph, Mass., June 26, 1897" (*J. R. Churchill*).

[1] See Sears, Geological Map of Essex County (1905).

Carex plantaginea Lam. Ashburnham, April 26 and May 17, 1896 (*Sydney Harris*). Listed in Jackson's Flora of Worcester County only from Southbridge.

Carex digitalis Willd. Hillside north of Echo Lake, Princeton, July 17, 1893 (*J. F. Collins*). No definite station cited in Jackson's Flora of Worcester County.

Carex laxiflora Lam., var. leptonervia Fernald. This comparatively northern and montane variety is represented in the Club Herbarium by three sheets from the eastern and central portion of Massachusetts: Waverly, June 9, 1861 (*Wm. Boott*); Ashburnham, May 17, 1896 (*Sydney Harris*); damp shades, Southbridge, May 17, 1899 (*R. M. Harper*).

Carex hirta L., a European species, is represented in the Gray Herbarium by material collected in 1878 near Hammond Pond, Newton, by Messrs. E. & C. E. Faxon and by specimens from "Grove," Medford, July 16, 1884 (*Wm. Boott*); and in the Club Herbarium by a poor but recognizable specimen from Melrose, June 7, 1882 (*C. E. Perkins*). In Dame & Collins's Middlesex Flora other stations are cited, but the species does not seem to have been recently collected. Is it extinct?

Carex acutiformis Ehrh. is another Old World species which was once established in our flora, but which may now be extinct. It formerly grew in a swamp ("border of salt marsh" one label reads) at Savin Hill in Dorchester, and in 1886 was said by Professor L. H. Bailey to be "thoroughly established at Dorchester, Mass.; boggy meadow, New Bedford, Mass., *Willey*."[1] The New Bedford plant has apparently not been collected by recent botanists and the most recently collected specimens from Savin Hill seen by the writer are dated August 9, 1884. These stations should be sought.

Carex Pseudo-Cyperus L. Wet meadow, Southbridge, altitude 640 feet, June 14, 1899 (*R. M. Harper*). Listed in Jackson's Flora of Worcester County only from Fitchburg.

Carex intumescens Rudge, var. Fernaldii Bailey. Rich damp woods, Southbridge, altitude 645 feet, June 27, 1899 (*R. M. Harper*). Not included in Jackson's Flora of Worcester County.

Colchicum autumnale L. Early in October, 1909, this beautiful species was found in some abundance, by the writer and a party of his students, established in a meadow between Carlisle and Concord.

[1] L. H. Bailey, Proc. Am. Acad. xxii. 76 (1887).

POLYGONATUM LATIFOLIUM Desf. Several plants of this Eurasian species grow by the roadside in slight shade, near the Concord River in Concord, where they were first noticed by the writer May 24, 1909. Since this species with comparatively thick green-tipped perianths is commonly cultivated it is possible that the references, in the Report on the Flora of the Boston District (RHODORA x. 130) to *P. giganteum* as "escaped" and "introduced," belong rather to *P. latifolium.*

BERTEROA MUTABILIS (Vent.) DC., a large-fruited species but recently recognized in our flora, is in the Club Herbarium from a "roadside" in Dedham, August 22, 1897 (*E. F. Williams*). Similar material in the Gray Herbarium, collected by W. P. Rich, bears the data: "roadside, border of cultivated ground." Another Massachusetts specimen in the Gray Herbarium comes from Hingham, September, 1894 (*T. T. Bouvé*).

SISYMBRIUM OFFICINALE (L.) Scop. The typical plant, with pubescent pods, is in the Club Herbarium from a "dump, West Cambridge, Mass., July 10, 1909 (*C. A. Weatherby*).

POTENTILLA REPTANS L. has been a weed in the lawn in front of the Gray Herbarium in Cambridge for at least ten years. It was first noticed in June, 1900, and in spite of resodding and alterations of the lawn and terrace still holds its own.

GEUM URBANUM L. is abundantly established by roadsides and borders of fields in the neighborhood of the Botanic Garden in Cambridge. The earliest evidence of this colony is a specimen in the Gray Herbarium collected by Professor L. H. Bailey and labeled "Cambridge, Mass., Aug., 1884. Thoroughly established."

AGRIMONIA MOLLIS (T. & G.) Britton. It is apparently not generally known to botanists of eastern Massachusetts that *A. mollis* occurs at Winchester. It was first found by the writer on the wooded diorite talus of Horn Pond Mountain, October 14, 1906; and the station, where the plant occurs in some abundance with *Polygonum dumetorum* L., has since been regularly visited in September or October.

TRIFOLIUM MEDIUM L. is either a much more local plant than is ordinarily supposed or it is very rarely collected. As represented in the Club Herbarium and the Gray Herbarium, it seems to be confined to eastern Massachusetts: "Boston, perhaps introduced?" (old specimen without date); "In pascius et pratis siccis (ex Europa advenam) ad *Danvers*" (*Wm. Oakes*); shady pastures about Salem,

July, 1863 (*J. L. Russell*); oak woods and rocky banks, North Salem, July 10, 1901 (*J. H. Sears*).

Melilotus indica (L.) All. should be watched for in waste lands. It is represented in the Club Herbarium or the Gray Herbarium by the following New England specimens, all from eastern Massachusetts: dump, Dracut, August 6, 1884 (*C. W. Swan*); Charlestown, July 4, 1879 and July 23, 1881 (*C. E. Perkins*); Charles River dumping grounds near Mt. Auburn, Cambridge, 22 August, 1897 (*B. L. Robinson*).

Desmodium canescens (L.) DC. is so rare in Middlesex County as to be practically unknown to local botanists. It was collected by the late William Boott at at least two stations, as shown by his labels: "W. Cambridge, roadside opposite W. Niles's house," August 15, 1853, and August 24, 1854; and "roadside, Winchester, opposite Everett's," August 22, 1869. Are these stations still in existence?

Linum floridanum (Planch.) Trel. is a plant which has but recently been known in New England. It was collected August 7, 1902, by Mrs. Clara Imogene Cheney in a bog at Centerville on Cape Cod and a beautiful sheet of Mrs. Cheney's material is preserved in the Club Herbarium.

Myriophyllum alterniflorum DC. Twenty years ago this boreal species was unknown from the continent of North America, but in 1891 Morong[1] recorded it from Lake Temiscouata (coll. *Northrop*) and Lake Memphremagog (coll. *Churchill*) in Quebec. Gradually our knowledge of its American distribution has increased until we now know it to be common from eastern Newfoundland to western Maine and to occur, perhaps locally, south to Massachusetts and west to Lake Superior.[2] The Massachusetts specimens, as representing the southern limit of the species, as far as known, are worthy special record; and it is also worthy of note that some of them were collected but unrecognized many years before the plant was recorded as a native of North America. The Massachusetts specimens thus far known are: Mystic Pond, August 26, 1853, and August 6, 1865 (*Wm. Boott*); Westford, September 2, 1902 (*Miss E. F. Fletcher*); Sprague's Pond, Readville (*C. E. Faxon*). The material from Sprague's Pond was mixed with *M. ambiguum*, forma *capillaceum*, a comparatively

[1] Morong, Bull. Torr. Bot. Cl. xviii. 242 (1891).

[2] Collected on Isle Royale, Michigan, August 6, 1909, by W. S. Cooper.

southern plant, so that it is not unreasonable to expect that *M. alterniflorum* may yet be found south of its present known limit.

STACHYS AMBIGUA (Gray) Britton, recently reported by Professor Wiegand (RHODORA, xi. 83) for the first time in New England, proves to have been collected several times in eastern Massachusetts. The Club Herbarium contains the following specimens: Lowell, near the Concord River, July 14, 1880 (*C. W. Swan*); in gravelly soil back from Newton Waterworks Basin, Needham, July 18, 1902 (*H. A. Purdie*); meadows, Charles River, Needham, August 26, 1905 (*J. R. Churchill*); boggy meadows, Sharon, July 12, 1896 (*W. P. Rich, E. F. Williams*). These stations and those already cited by Professor Wiegand indicate that the plant is somewhat generally distributed in the valleys of the Concord, Charles, and Neponset Rivers.

LYCOPUS EUROPAEUS L. This coarse species has grown in waste land and neglected yards about the "Tin Cañon" in Cambridge for at least sixteen years. The earliest collection was made by Professor B. L. Robinson in October, 1894.

HYOSCYAMUS NIGER L. The Henbane, which was recorded from New England by Josselyn in 1672;[1] in the days of Manasseh Cutler (1785) was "common amongst rubbish, and by road sides";[2] by Jacob Bigelow, in 1814, was included in the Florula Bostoniensis from "waste grounds"[3] and in 1840 from "roadsides, &c.,"[4] is now one of our rarest plants and it is not improbable that it has entirely disappeared from our Massachusetts flora. In the Gray Herbarium there are no specimens from south of Maine, where it is very local and has a bare foot-hold, but in the Club Herbarium are two specimens: Boston, July 15, 1880 (*C. E. Perkins*); Somerville, September 25, 1886 (*F. S. Collins*). In the Flora of Essex County, Mr. John Robinson cites two old stations only besides an indefinite "Essex County" of William Oakes and makes the comment that "*Hyoscyamus niger* and *Artemisia Absinthium* (Wormwood), spoken of by Dr. Cutler and other earlier writers as common in waste places, are now very rare or unknown."[5] That *Hyoscyamus* should have passed so completely from our flora, when a century and a quarter

[1] Josselyn, N. E. Rarities, 86 (1672); Tuckerman reprint, 114.
[2] M. Cutler, Mem. Am. Acad. i. 419 (1785).
[3] Bigelow, Fl. Bost. 52 (1814).
[4] Bigelow, Fl. Bost. ed. 3, 84 (1840).
[5] J. Robinson, Fl. Essex Co. 15 (1880).

ago it was an established weed, is of peculiar interest, for throughout the longer-settled regions of calcareous sections of Quebec, from the city of Quebec to the base of the Gaspé Peninsula, it has maintained its weed-character and its slimy foliage and lurid flowers are familiar to nearly everyone who takes special note of the vegetation.

PEDICULARIS LANCEOLATA Michx. is not generally recognized from east of the Connecticut. In the Club Herbarium, however, is a sheet of *P. lanceolata*, originally in the collection of the Middlesex Institute, labeled: "Revere just over the line [from Middlesex County]. *Moody*." As far as the writer is informed no one else has recently seen this plant in eastern Massachusetts and it is feared that its tall stature and rather showy flowers long ago led to its extinction. The plant is worthy special note not only as a rare species which is now probably extinct but as another member of the peculiarly rich and isolated flora (typical from western New England westward) for which the town of Revere (including Oak Island) [1] has been famous since the days of Jacob Bigelow, a flora including several species unknown or almost unknown elsewhere in eastern Massachusetts: *Elymus virginicus*, var. *submuticus* (see above), *Amphicarpa Pitcheri*, *Sanicula gregaria*, *Agastache scrophulariaefolia*, *Collinsonia canadensis*, *Scrophularia marilandica*, *Aster salicifolius*, &c.

CAMPANULA ULIGINOSA Rydberg. Many local botanists have expressed surprise that this species as well as *C. aparinoides* Pursh, is found in our territory. It is in the Club Herbarium from Rock Pond, Georgetown and from South Georgetown (*Mrs. Horner*) and in the Gray Herbarium from Concord (*J. M. Greenman*), Fresh Pond, Cambridge (*Wm. Boott*), and Sharon (*S. F. Poole*).

HELIANTHUS MAXIMILIANI Schrad., recently reported from scattered eastern stations, was found by Mr. F. S. Collins in a "rather sandy field" by Wright's Pond, Middlesex Fells, August 29, 1909.

GALINSOGA CARACASANA (DC.) Sch. Bip. appeared as a weed in the Botanic Garden, Cambridge, in 1909, and is thriving this year, the coarse sprawling stems often measuring more than 1 m. in length.

GRAY HERBARIUM.

[1] See H. A. Young, Bull. Essex Inst. xiv. 141–157 (1882); Reprint 1–19 (1883). W. P. Rich, RHODORA, iv. 87–94 (1902).

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NOTES ON NEW ENGLAND HEPATICAE,— VIII.

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THE additions made to the hepatic flora of New England during the past year include two *Ricciaceae*, the rare *Lophozia Kaurini*, and two species of *Frullania*. All of these are discussed in the present paper. Another species, *Pedinophyllum interruptum*, although found in New England by Oakes many years ago and cited by Austin and Underwood, is here recorded for the first time from a definite New England locality. Attention is also called to three species of *Lophozia* which are variously interpreted by authors, and a number of additions to local state floras are mentioned at the close of the paper.

1. RICCIA SOROCARPA Bisch. Nova Acta Caes. Leop.-Carol. **17**: 1053. *pl. 71, f. II.* 1835. *R. minima* L. Sp. Plant. 1139. 1753 (in part). *R. Lindenbergiana* Sauter, Flora **28**: 132. 1845. *R. epicarpa* Wallr.; G. L. & N. Syn. Hep. 600. 1846. *R. Raddiana* Jack & Levier; Stephani, Bull. de l'Herb. Boissier **6**: 336. 1898. On sandy soil, sometimes among rocks. Connecticut: Plainfield (*J. L. Sheldon*, 1908); New Haven and New Milford (*G. E. Nichols*); Brookfield (*A. W. E.*). The occurrence of *R. sorocarpa* in Connecticut has already been recorded by Sheldon.[1] In all probability its range extends throughout New England, although no stations, other than those noted, are known at the present time. According to Underwood[2] the species has been found in New York, New Jersey, South Carolina, Illinois, and California, while C. Jensen[3] reports it

[1] Bryologist **13**: 64. 1910.
[2] Bot. Gaz. **19**: 278. 1894.
[3] Meddel. om Grønland **15**: 369. 1898.

from Greenland. It is also widely distributed in Europe and Asia, especially in the north.

The plants as a rule do not form rosettes but branch only once or twice and are irregularly scattered over the substratum. The branches of the thallus are usually from 3 to 4 mm. long and from 0.5 to 1 mm. wide and taper toward the apex. The upper surface is grayish green, sometimes tinged with reddish, and shows a narrow median groove in the apical region. In the older parts of the thallus the groove becomes more or less flattened out. The postical scales are colorless and inconspicuous, and there are no marginal hairs. In transverse section the thallus is a little broader than thick, and its sides are almost vertical, although they flare somewhat above and thus form an acute angle with the upper edge.

The photosynthetic tissue, as is characteristic for the entire genus, consists of cells in vertical rows separated by narrow air-canals. In sections cut near the apex the uppermost cell of each row is thin-walled and strongly inflated. Soon, however, the lower part of the wall becomes thickened and the thin upper part disappears. In this way there is nothing left of the cell except a shallow cup-shaped portion, which appears U-shaped in section. The cells below these uppermost cells soon acquire thick walls also, but here the thickening is more or less uniform throughout and the cells remain intact, assuming the function of an epidermis. In some cases, especially toward the edge of the thallus, the thickening affects three or four cells of a row, so that the functional epidermis may be two or even three cells thick. The thick-walled cells are usually colorless and stand in marked contrast to the green cells below them. The peculiarities just noted were first adequately described by Heeg[1] and are clearly shown in a figure recently published by Müller.[2] They yield some of the most distinctive characters of the species.

The capsules of *R. sorocarpa* are irregularly scattered in the thallus. The mature spores measure 70–95 μ in diameter and are dark brown. The convex faces of the spores are finely and regularly reticulate, the ridges bounding the meshes being about 4 μ high. The three triangular faces commonly show irregular and minute thickenings but may be almost smooth. At the junction between the convex

[1] Bot. Not. 1898: 19.

[2] Rabenhorst's Kryptogamen-Flora **6**: 145. *f. 101d.* 1907.

face and the triangular faces a narrow pale brown wing is developed, the margin of which is minutely and irregularly crenulate.

As shown by the synonymy *R. sorocarpa* is one of the component parts of *R. minima* L. The Linnaean species was based on three non-binomial species published prior to 1753. The first of these was Riccia frondibus glabris bipartitis acutis L. (Fl. Suec. 341. 1745); the second, Riccia minima, nitida, segmentis angustioribus, acutis Mich. (Nov. Plant. Gen. 107. *pl. 57, f. 6.* 1729); the third, Lichen omnium minimus, foliolis scissis, super terram expansis Dill. (Hist. Musc. 534. *pl. 78, f. 11.* 1741). If reference is made to the Flora Suecica it will be found that Linnaeus first described his non-binomial species in 1741 (Kongl. Svenska Vetensk. Acad. Handl. Stockholm **2**: 209), the same year in which Dillenius published his Historia Muscorum. In both places Linnaeus quotes Micheli's plant as a synonym, while the Dillenian species, as would naturally be expected, first appears as a synonym in the Flora Suecica. In the absence of a Linnaean type for *R. minima*, it becomes necessary to interpret the species from the descriptions, figures, and specimens of Micheli and Dillenius. Levier[1] has clearly shown that Micheli's species is what is now known as *R. nigrella* DC., while Lindberg[2] has proved the identity of the Dillenian species with *R. sorocarpa* Bisch. The question at once arises, for which of these two distinct species should the name *R. minima* be retained? The application of either the Vienna Rules for Nomenclature or the American Code would indicate *R. nigrella*, in spite of the fact that Lindberg and Arnell,[3] Schiffner,[4] and Howe[5] have decided in favor of *R. sorocarpa*. Possibly their decision was based on the fact that the only stations mentioned by Linnaeus under his non-binomial species are in Sweden, where *R. nigrella* has not yet been discovered. It should be remembered, however, that the two early works in which the species is referred to were devoted to the flora of Sweden, and that Linnaeus certainly implied a much more extensive distribution for his plant by quoting the species of Micheli and Dillenius. In the Species Plantarum he describes the habitat as "Europe," without citing definite localities. Levier, who has treated the question at considerable length, wisely

[1] Rev. Bryol. **20**: 101–105. 1893.
[2] Acta Soc. Sci. Fenn. **10**: 471. 1875.
[3] Kongl. Svenska Vetensk.-Akad. Handl. **23**[5]: 14. 1889.
[4] Engler & Prantl, Nat. Pflanzenfam. **1**[3]: 15. 1893.
[5] Mem. Torrey Club **7**: 23. 1899.

suggests that the name *R. minima* be given up altogether and that both *R. nigrella* and *R. sorocarpa* be known by the names under which they were first clearly distinguished.

2. **Ricciella membranacea** (Gottsche & Lindenb.) comb. nov. *Riccia membranacea* Gottsche & Lindenb.; G. L. & N. Syn. Hep. 608. 1846. *Riccia tenuis* Aust. Proc. Acad. Philadelphia for 1869: 233. In a dried up ditch. Hartford, Connecticut (*E. B. Harger* and *Miss Lorenz*). New to New England. The type locality of *R. membranacea* is in Mexico, while that of *Riccia tenuis* is in New Jersey. The latter species was considered distinct until Stephani [1] reduced it to synonymy in his Species Hepaticarum. According to Underwood [2] it occurs in New Jersey, Delaware, Ohio, Missouri, and Arkansas. The writer has found it also near Cayey, Porto Rico, and the specimens from this locality agree closely with those from Hartford. If Spruce's *Riccia lanigera*,[3] as Stephani asserts, is likewise to be considered a synonym of *R. membranacea*, then the range of the species extends well into South America. Spruce's description, unfortunately, disagrees in several important respects, so that the identity of the two species cannot yet be regarded as thoroughly established.

The plants of *R. membranacea* bear considerable resemblance to the prothallia of ferns. They grow closely appressed to the ground, sometimes scattered, sometimes more or less crowded and forming irregular mats or patches. They are dark green but often appear somewhat paler on account of the air in the large intercellular spaces described below. The thallus is broad and thin, practically plane on the upper surface, and usually forks only once or twice. It measures from 3 to 5 mm. in length, and the broad divisions, which are truncate and narrowly indented at the apex, are 2 to 3 mm. wide. The texture of the thallus is exceedingly delicate, and the central region, except where the sporophytes are situated, is rarely more than 0.3 mm. thick. From this central region the wings gradually thin out toward the edge, which is bordered by a margin about three cells wide and only one cell thick. Even in the median part of the thallus the solid basal tissue is only a few cells thick and quickly becomes reduced to a single layer in the wings. The bulk of the thallus is made up of a loose photosynthetic tissue in which the air spaces are

[1] Bull. de l'Herb. Boissier **6**: 361. 1898.
[2] Bot. Gaz. **19**: 278. 1894.
[3] Hep. Amaz. et And. 570. 1885

large and irregular. In most cases they are arranged in only one or two layers. They are separated from one another by thin plates of green cells and are bounded above by an epidermis one cell thick composed of similar cells. The outlines of the air spaces can often be seen clearly through the epidermis, and some of them at least communicate with the outside air by means of irregular pores. Postical scales could not be demonstrated in the material studied, although Austin [1] states that they sometimes occur.

The mature capsules of *R. membranacea* are irregularly scattered in the thallus and bulge out from the lower surface. They attain a diameter of 0.3–0.45 mm. The spores are oval and dark brown, measuring about 40 μ in length. The surface is thickly covered over with short blunt spines, 2–3 μ long, and these are especially numerous on the convex face. The three triangular faces are indistinct at maturity, and there is no wing developed at their junction with the convex face.

Among the New England species of *Ricciella*, *R. crystallina* (L.) Warnst. seems to be the closest ally of the present species. *R. crystallina*, however, is considerably larger, and the epidermis, which is at first continuous over the large intercellular spaces, eventually breaks down more or less completely and leaves the photosynthetic tissue directly exposed to the air. The upper surface of the thallus thus acquires a peculiar spongy appearance. The spores of *R. crystallina* are likewise very different. They are much larger, usually 70–80 μ in diameter, the surface is reticulate, and a delicate wing is developed where the triangular faces meet the convex face.

3. Lophozia badensis (Gottsche) Schiffn. Lotos **51**: [7]. 1903. *Jungermannia acuta* Lindenb. Nova Acta Caes. Leop.-Carol. **14**, suppl.: 88. 1829 (in part). *J. badensis* Gottsche; Rabenhorst, Hep. Europ. *95*. 1859. On damp limestone rocks. Hartford, Vermont (*Miss Lorenz*). Salisbury, Connecticut (*A. W. E.*). The discovery of *L. badensis* in Quebec has recently been noted by the writer.[2] During the past summer Miss Lorenz found the species in Vermont, as above recorded, and pointed out the fact that the specimens from Salisbury, Connecticut, which were reported a few years ago as *L. Muelleri* (Nees) Dumort.,[3] also agreed better with *L. badensis*

[1] Hep. Bor.-Amer. *150*. 1873.
[2] Bryologist **13**: 34. 1910.
[3] See Evans, Rhodora **8**: 35. 1906.

and should be referred to the latter species. *L. badensis* has likewise been collected near Ithaca, New York, by A. LeRoy Andrews and probably has an extensive range in North America. The relationship between *L. Muelleri* and *L. badensis* is so close that many European writers have regarded them as forms of a single variable species. At the present time, however, there is a strong tendency to consider them distinct. In both species the inflorescence is dioicous, the leaves are bifid with usually pointed lobes, the leaf-cells have trigones and a striolate cuticle, and the perianth is terete and abruptly contracted into a tubular beak. In *L. badensis*, however, the plants are smaller than in *L. Muelleri*, the leaf-cells are a little larger, and the trigones are less developed. There are also important differences in the underleaves. In *L. badensis* these are usually absent altogether and even when they are present they are minute and often evanescent. In *L. Muelleri*, on the contrary, they are uniformly present and persistent.

4. Lophozia Kaurini (Limpr.) Steph. Bull. de l'Herb. Boissier II. **1**: 1147. 1901. *Jungermannia Kaurini* Limpr. Jahresb. Schles. Gesell. Vaterl. Cultur **61**: 204. 1884. On damp limestone rocks. Quechee Gulf, Hartford, Vermont (*Miss Lorenz*). The determination of the specimens was made by Miss Lorenz. This is the second known station for North America, the first being Hunker Creek, Yukon Territory, where the species was discovered by J. Macoun.[1] In Europe it is also rare but is now known from a number of localities in Norway, Sweden, Finland, Switzerland, and Italy. Its range likewise extends into Siberia, where it was found by Arnell. In *L. Kaurini* the leaves are bifid, the leaf-cells have conspicuous trigones and a strongly verruculose cuticle, underleaves are uniformly present, the perigonial bracts develop a small antical lobe, and the terete perianth is abruptly contracted into a tubular beak with a ciliate mouth. All of these peculiarities show a close relationship to *L. Muelleri*, with which *L. Kaurini* has been more or less confused. It may be at once distinguished, however, by its paroicous inflorescence, *L. Muelleri* being dioicous. In *L. Rutheana* (Limpr.) M. A. Howe, another close ally which is perhaps to be expected in New England, the inflorescence is also paroicous. Fortunately there is little danger of confusing the two species because *L. Rutheana* is

[1] Ottawa Nat. **17**: 20. 1903.

much more robust and is frequently tinged with purplish or reddish, *L. Kaurini* being green. *L. Rutheana* is further distinguished by larger and more complex underleaves and by the fact that it grows in swamps rather than on rocks.

5. Lophozia marchica (Nees) Steph. Bull. de l'Herb. Boissier II. **2**: 48. 1902. *Jungermannia marchica* Nees, Naturgeschichte der europ. Lebermoose **2**: 77. 1836. *J. laxa* Lindb. Acta Soc. Sc. Fenn. **10**: 529. 1875. In Sphagnum bogs. Maine: Beech Mountain, Mt. Desert (*E. L. Rand*); near Schoodic Lake (*A. W. E.*). New Hampshire: Waterville (*Miss Lorenz*). This rare species is widely distributed in northern Europe and is also known, in North America, from Ellesmere Land and from New Jersey. In all probability its range extends throughout New England.

6. Lophozia Mildeana (Gottsche) Schiffn. Lotos **51**: [54]. 1903. *Jungermannia Mildeana* Gottsche, Verhandl. der k. k. zool.-botan. Gesellsch. in Wien **17**: 626. *pl. 16.* 1867. *J. Novae-Caesareae* Evans, Bull. Torrey Club **20**: 308. *pl. 163.* 1893. *Lophozia Novae-Caesareae* Steph. Bull. de l'Herb. Boissier II. **2**: 161. 1902. In sandy swamps, sometimes among Sphagnum. Maine: Biddeford Pool (*Miss Lorenz*). New Hampshire: Franconia Mountains (*Miss Haynes, etc.*); Waterville (*Miss Lorenz*). Vermont: Jericho (*A. W. E.*). Massachusetts: Woods Hole (*A. W. E.*). Connecticut: East Haven, Huntington, and Orange (*A. W. E.*); Milford (*Miss Lorenz*).[1] The species is also known in North America from New Jersey, Delaware, and West Virginia and has an extensive range in Europe.

In the writer's first series of Notes on New England Hepaticae,[2] *L. Mildeana* was included under *L. marchica* as a synonym, thus following the example of Stephani in his Species Hepaticarum. Since that time Warnstorf,[3] Schiffner, and Müller,[4] although recognizing the close relationship between the two plants, have maintained the validity of *L. Mildeana* as a species. The same course is followed in the present paper. In the majority of cases the two plants can be distinguished at a glance. In *L. marchica* the plants are commonly scattered among tufts of Sphagnum, the stems are more or less pig-

[1] Most of these stations have already been reported under *L. marchica*.
[2] Rhodora **4**: 207 213. 1902.
[3] Kryptogamenfl. der Mark Brandenburg **1**: 200. 1903.
[4] Rabenhorst's Kryptogamen-Flora **6**: 699. 1910.

mented with purple, the leaves are distant and pale green, and the leaf-cells are thin-walled throughout. In *L. Mildeana*, on the other hand, the plants are often tufted and grow on moist sandy soil as well as among Sphagnum, the stems are pale green, the leaves are frequently crowded and pigmented with purple, and the leaf-cells, especially in exposed localities, have their walls more or less thickened. In gemmiparous forms of *L. Mildeana* the stems are delicate and usually bear scattered leaves without any sign of pigmentation. Under such conditions the characters of the species are not clearly shown. There is little danger, however, of confusing such plants with *L. marchica* and a careful search will often show more typical plants in the near vicinity.

7. PEDINOPHYLLUM INTERRUPTUM (Nees) Pearson, Hep. British Isles 269. *pl. 111.* 1900. *Jungermannia interrupta* Nees, Naturgeschichte der europ. Lebermoose **1**: 165. 1833. *Plagiochila interrupta* Dumort. Recueil d'Obs. sur les Jung. 15. 1835. *P. macrostoma* Sulliv. Musc. Alleg. *221.* 1846. *Plagiochila* (*Pedinophyllum*) *pyrenaica*, var. *interrupta* Lindb. Not. Soc. F. et Fl. Fenn. **13**: 367. 1874. *Pedinophyllum pyrenaicum*, var. *interruptum* Schiffn.; Engler & Prantl, Nat. Pflanzenfam. **1**^{3}: 89. 1893. *Plagiochila* (*?*) *lobata* Kaalaas, Nyt Mag. f. Naturv. **33**: 274. 1893. New England, *W. Oakes.* On dolomite rocks in a ravine; Brookfield, Connecticut (*A. W. E.*). The distribution of *P. interruptum* in North America is very incompletely known. It has been reported from Greenland, Labrador, Ohio, and from a few localities in Canada. It has a wide range in Europe, and Stephani notes its occurrence in Japan.[1]

The genus *Pedinophyllum* is at present monotypic and was based by its author, Lindberg,[2] upon *Plagiochila pyrenaica* Spruce,[3] a species which is now considered to be a peculiar form or variety of *P. interrupta.* Many subsequent writers have denied the validity of the genus and have continued to include *P. interruptum* among the species of *Plagiochila.* Spruce,[4] to be sure, suggested that *Pedinophyllum* might be considered a distinct subgenus under *Plagiochila*, admitting that *P. interrupta* differed from typical *Plagiochilae* in several important respects. Stephani, however, does not grant it

[1] Bull. de l'Herb. Boissier **5**: 81. 1897.
[2] Acta Soc. Sc. Fenn. **10**: 504. 1875.
[3] Ann. & Mag. Nat. Hist. II. **4**: 105. 1849.
[4] Hep. Amaz. et And. 452. 1885.

even subgeneric rank. Among those who maintain the distinctness of the genus may be mentioned Pearson, Schiffner, and Müller. According to Schiffner [1] *Pedinophyllum* shows two important characters which necessitate its separation from *Plagiochila*, and these are the characters which Lindberg insisted upon when he first proposed the genus. They are, first, the general habit of the plants and, second, the inflorescence. In *Pedinophyllum* there is no distinction between rhizome and leafy shoot, both the stem and its branches being prostrate and frequently producing rhizoids; in *Plagiochila*, on the other hand, the plant consists of a creeping rhizome from which the leafy shoots, usually destitute of rhizoids, ascend. In *Pedinophyllum* the inflorescence is autoicous, whereas in all accepted species of *Plagiochila* it is dioicous. As a matter of fact, *Pedinophyllum* is more closely related to *Mylia* (*Leptoscyphus*) and *Chiloscyphus* than it is to *Plagiochila*. It differs from *Mylia* in the fact that the female inflorescence is borne on a short branch instead of on an elongated branch or the main stem; it differs from *Chiloscyphus* in the fact that the perianth is laterally compressed instead of being triquetrous. The relationships and differences are clearly brought out by Schiffner.

In the field *P. interruptum* bears a marked resemblance to *Chiloscyphus polyanthus* and *Ch. pallescens*. Fortunately, it is usually fertile, and the compressed perianth will at once distinguish it. The female branch, moreover, although short, is never quite so abbreviated as in *Chiloscyphus* and may bear several pairs of leaves. In the absence of perianths the minute underleaves and the trigones in the leaf-cells may serve to separate the *Pedinophyllum*, the underleaves in *Chiloscyphus* being much better developed and the leaf-cells (in the two species in question) being thin-walled throughout. The perigonial bracts in *P. interruptum* bear a small pouch or lobe at the antical base, agreeing closely in this respect with *Chiloscyphus*.

8. FRULLANIA INFLATA Gottsche; G. L. & N. Syn. Hep. 424. 1845. Evans, Trans. Conn. Acad. **10**: 10. *pl. 3.* 1897. On trees and rocks. Brookfield, Connecticut (*A. W. E.*). New to New England. A note on the distribution of *F. inflata* was recently published by the writer,[2] and the specimens just reported were discovered soon afterwards. Those growing on trees were abundant, while those on rocks were very scanty. In both cases there was more or

[1] Ber. d. naturw.-med. Ver. in Innsbruck **31**: [53]. 1908.

[2] Bryologist **13**: 36. 1910.

less admixture with *F. eboracensis.* According to our present knowledge *F. inflata* is confined to the United States. Its range extends from Connecticut westward to Minnesota and southward to the District of Columbia, Mississippi and New Mexico. It strongly resembles *F. eboracensis* but differs in its autoicous inflorescence and in its leaf-cells, which have trigones but no intermediate thickenings. In *F. eboracensis* the inflorescence is dioicous and the leaf-cells have thickenings of both types, thus making the contours of the cell-cavities irregular.

9. Frullania saxicola Aust., Proc. Acad. Philadelphia for 1869: 225. On trap rocks. Woodbridge, Connecticut (*A. W. E.*). The present species was based on specimens collected by Austin near Closter, New Jersey. He afterwards found it near Little Falls in the same state and distributed specimens, presumably from these two localities, in Hep. Bor.-Amer. *104*. The only other specimens which he quoted were collected by Wright in Texas. The plants distributed by Austin are more or less mixed with the form of *F. eboracensis* which, as *F. virginica,* used to be considered a distinct species. When the writer revised the North American species of *Frullania,* thirteen years ago, the specimen of this number which he examined was practically pure *F. virginica,* and on this basis Austin's species was reduced to *F. virginica* as a synonym.[1] A recent study of the same number in another set, where the admixture is less, shows conclusively that this reduction was unwarranted and that *F. saxicola* should be again recognized as a distinct species. The rocks where the Woodbridge specimens grow are near the bottom of a talus slope and are more or less exposed to the sun. This locality and those quoted by Austin are the only ones that can be cited at the present time.

The relationships of *F. saxicola* are with *F. inflata* rather than with *F. eboracensis,* although all three belong to the subgenus *Trachycolea* of Spruce. It agrees with *F. inflata* in the following important characters: the leaf-lobes are rounded but not cordate at the antical base; the leaf-cells have trigones but no intermediate thickenings; the inflorescence is autoicous; the perianth is pluriplicate with uneven but not tuberculate keels. The lobules of the leaves are almost invariably explanate in *F. saxicola* and are in the form of small lanceo-

[1] Trans. Conn. Acad. **10**: 17. 1897.

late expansions, acute to obtuse at the apex and quite entire except for the small basal stylus. Explanate lobules also occur with considerable frequency in *F. inflata*, although many stems fail to produce them altogether. The most important distinction between *F. inflata* and *F. saxicola* is found in the beak of the perianth. In *F. inflata* the beak is short but plainly tubular, the mouth is entire, and the inner surface is perfectly smooth. In *F. saxicola* the beak is still shorter and often cup-shaped, the margin is setulose from cells which project in the form of rounded papillae, and similar papillae arise from the inner surface, thus blocking up the opening. An approach to the condition found in *F. saxicola* is shown by *F. Kunzei* and by the three other members of the subgenus *Diastoloba* which are known from the United States. In these species, however, the papillae are restricted to the mouth of the beak and the inner surface is perfectly smooth.

A new species very similar to *F. saxicola* was recently described by Schiffner [1] under the name *F. cleistostoma* Schiffn. & Wollny. This plant also grows on rocks and is known at present from only two localities, both of them in the Tirol. It shares with *F. saxicola* the important characters listed above in connection with *F. inflata*, and the beak of the perianth is papillate in precisely the same way. No specimens of *F. cleistostoma* have been seen by the writer, but two points of distinction have been made out from the study of the published description and figures. In *F. cleistostoma* the median leaf-cells measure 26–30 μ, and the involucral bracteole is bifid only one fourth; in *F. saxicola* the median leaf-cells measure only 18–23 μ, and the bracteole is usually bifid one third or more. Whether these differences are sufficient to separate the two plants is doubtful, but the comparison of specimens would probably bring to light other points of distinction.

The additions to local state floras not alluded to in the preceding pages are as follows: —

For Maine. *Diplophylleia apiculata;* Industry (*J. F. Collins*).

For New Hampshire. *Pellia Neesiana* and *Cephaloziella elachista;* Waterville (*Miss Lorenz*).[2]

[1] Oesterr. Bot. Zeitschr. **59**: 467–472. *f. 1–26.* 1909.

[2] Some of the records for *C. elachista* may have to be revised in the future. The New Hampshire plants, for example, agree closely with *Cephalozia striatula* C. Jens. (Rev. Bryol. **31**: 25. 1904), but the distinctions between this species and *C. elachista* are not yet definitely established.

For Vermont. *Metzgeria furcata;* Woodstock (*D. L. Dutton*). *Cephalozia connivens;* Brandon (*D. L. Dutton*). *Cephaloziella elachista;* Woodstock (*Miss Lorenz*). *Lophozia alpestris* and *Scapania dentata;* Rochester (*D. L. Dutton*).

For Massachusetts. *Metzgeria crassipilis;* Hammond Pond (*E. Faxon*).

For Rhode Island. *Porella pinnata;* Johnston (*J. F. Collins*). *Cephalozia fluitans;* Burrillville (*J. F. Collins*). The Rhode Island records for *Ricciella fluitans* and *Preissia quadrata* may also be marked with the sign "+".

For Connecticut. *Metzgeria furcata;* Woodbridge (*A. W. E.*). *Pellia Fabroniana;* Kent (*A. W. E.*). *Cephalozia pleniceps* and *Cephaloziella elachista;* Brookfield (*Miss Lorenz* and *A. W. E.*). *Anthoceros Macounii;* Hartford and Wethersfield (*Miss Lorenz*).

The census of New England Hepaticae now stands as follows: Total number of species recorded, 162; number recorded from Maine, 108; from New Hampshire, 123; from Vermont, 97; from Massachusetts, 86; from Rhode Island, 66; from Connecticut, 120; common to all six states, 44.

Yale University.

TWO PLANTS NEW TO MASSACHUSETTS.

Arthur J. Eames.

Potamogeton hybridus Michx., var. multi-denticulatus (Morong) Asch. & Graebner.— This plant is of coastal plain distribution, and, according to the last edition of Gray's Manual, has not been known north of Connecticut. Like *P. hybridus* itself, it inhabits, apparently, shallow, quiet water. In Learned's Pond, South Framingham, Massachusetts, it occurs in an unusual way,— in *deep* water. Although for years I have been constantly on this pond, I had known no *Potamogeton* to occur there. But in September, 1909, I observed long stems of some water plant reaching up from deep water toward the surface. Investigation showed many plants of *P. hybridus*, var. *multi-denticulatus* growing in twelve to eighteen feet of water.

Many of them had only the typical setaceous submersed leaves, but others had sent up long (6–10 feet) slender branches, and developed "floating" leaves under water, along the upper portions. All the plants were fruiting abundantly, the fruits being strongly toothed on all three keels. This development of "floaters" under water seems unusual. The pond-level has not changed (save a few inches) for a great many years, and the plants could not have become accustomed to more shallow water, nor could floating leaves have been submerged by the raising of the water level. Further, the plants are growing near the center of a large pond. These submersed "floaters," though on obviously etiolated stems and petioles, appear to be healthy, and to have lived successfully under conditions for which they are not fitted structurally. The occurrence of this plant in this form and habitat suggests that a shallow water form has become established in deep water, or that the habits of this variety are not sufficiently known. It seems possible that further investigation may show this plant to be a good species.

Tridens flavus (L.) Hitchc. This tall, handsome grass was found in August, 1909, in Southboro, Massachusetts, abundant in old fields near the Sudbury Dam. It is a plant worthy of cultivation, and may be an escape, though it does not appear to be such.

South Framingham, Massachusetts.

Notes on Agropyron. — Through the courtesy of Mrs. Agnes Chase, I was enabled to examine the type specimen of *Agropyron tenerum* Vasey var. *longifolium* Scribn. & Sm. U. S. Dept. Agr. Div. Agrost. Bull. no. 4, 30 (Feb. 6, 1897) at the United States grass herbarium and I am convinced that it is not separable from *A. tenerum* Vasey, to the synonymy of which I would therefore add it.

By an oversight of mine, it was stated in the recent article which I published in conjunction with Prof. A. S. Pease, Rhodora, xii, 61–77 (April 18, 1910), that Vasey cites no specimens under his original description of *A. Scribneri*, Bull. Torr. Bot. Club, x, 128 (Dec. 1883). This is incorrect. Vasey cites two, but does not state which is the type specimen. The first is fully cited — "It was collected by Mr. C. G. Pringle in the Sierras in 1882, altitude 9,500 ft., and distributed as *Triticum caninum* L.?," as if it were the type specimen; while the second is merely referred to as follows: "It was collected the past

season in Montana by Mr. F. L. Scribner, to whom I take pleasure in dedicating it." It has been suggested to me that, owing to the fact that the plant is named for Mr. Scribner, the latter reference should be considered as determining the type, despite the fact that it occupies a secondary position and is apparently more casual in expression. However this may be, both specimens, to my mind, confirm the opinion advanced by Prof. Pease and myself in the above mentioned article, that *A. Scribneri* is not clearly separable from *A. caninum* (L.) Beauv. var. *Gmelini* (Ledeb.) Pease & Moore f. *Pringlei* (Scribn. & Sm.) Pease & Moore, l. c. (*A. Gmelini* (Ledeb.) Scribn. & Sm. var. *Pringlei* Scribn. & Sm.).— Albert Hanford Moore, Washington, D. C.

Pogonia trianthophora in Holderness, New Hampshire.— *Pogonia trianthophora* (Sw.) BSP., better known as *Pogonia pendula* Lindl. of Gray's Manual, 6th ed., is a rare orchid in New England. There have been but few references to it in this journal (Rhodora, ii. 211–212, 1900; iv. 2–3, 19–22, 61, 1902) all showing its rarity and elusive character.

I am indebted to Mr. Edwin DeMeritte for another record of this species in New England. On August 27, 1910, he sent me from his summer Camp Algonquin, on the shores of Squam Lake, Holderness, New Hampshire, four fresh specimens of this orchid, collected there the same day. In the accompanying letter he says that the plant "is found here only after August 15, and only in depressions in the woods where the leaf-mould is very deep. It is rather rare even where it is found, and appears about once in three years in any quantity. No specimens could be found in 1908 and 1909. Perhaps they came out after we left camp, September 4." — Walter Deane, Cambridge, Massachusetts.

The Sixteenth Annual Field Meeting of the Vermont Botanical Club was held at Woodstock, Vt., July 4–6, 1910, with about 40 members of the club in attendance.

Monday afternoon, July 4, a visit was made to Quechee Gulf where *Woodsia alpina* (Bolton) S. F. Gray, *W. glabella* R. Br., and *Tofieldia glutinosa* (Michx.) Pers., among other plants, were collected.

In the evening after its arrival at Woodstock the Arts and Crafts

Rooms were opened to the Club for an exhibition of fresh flowers and mounted specimens. After an informal social session a short business meeting was held and twelve new members were elected.

Wednesday forenoon, July 5, was spent partly on the Billings' estate in the inspection of the formal gardens, glass houses, wild fernery and nursery, and partly in botanizing on Mt. Tom. A bountiful lunch was served at the home of Prof. and Mrs. Frederic Lee.

In the afternoon a drive was taken to the Eshqua Bogs in Hartland. Here were fine specimens of *Lycopodium sabinaefolium* Willd. and *L. tristachyum* Pursh and some of the rarer orchids. Supper was served by the Hartland Nature Club at Mr. and Mrs. A. B. Morgan's home, "The Highlands." Afterwards a Life Membership Circle was formed with six members, which was later increased to eight. The proceeds from this are to form a fund for the Club.

In the evening a lecture was given in the Opera House on "Our Native Wild Flowers" by Dr. N. L. Britton, the noted botanist. This was splendidly illustrated by lantern slides from the Van Brunt collection.

Wednesday morning, July 6, a drive was taken to North Bridgewater to see the Male Fern, *Aspidium Filix-mas* (L.) Sw. This, the third station for this fern in the state was discovered by Miss Mabel A. Strong. Here was also collected a new hybrid *Aspidium*, *A. Filix-mas* × *marginale*.

The meeting was one of the most interesting the Club has had and the efforts of the resident members of the Botanical Club and the members of the Hartland Nature Club were appreciated.

The next meeting will be held at Burlington, Vt., in Jan., 1911.—Nellie F. Flynn.

Ornamental Shrubs of the United States.[1]— Forty or fifty years ago the limits between native vegetation on the one hand and flower beds, borders, and ornamental shrubbery on the other, were pretty sharp and definite. The whole trend of modern horticulture and landscape gardening, however, has been to efface these boundaries as completely as possible, to do away with the formal flower bed,

[1] Ornamental Shrubs of the United States (hardy, cultivated), a posthumous work by the late Professor Austin Craig Apgar, edited by his daughter Ada Apgar Draycott. Octavo, 352 pages, 4 plates, and 621 text figures. American Book Company, New York, etc. $1.50.

straight rows of shade trees, and all such evidences of artificiality, to make the foreign plant, when used for ornament, appear to be in its natural environment, and to make it seem at home. As a consequence of these more artistic ideals of the landscape architect it is becoming more and more difficult for the young botanist to distinguish between plants which are native or naturalized and those which, along parkways, roadsides, etc.,— the only botanizing grounds readily accessible to many city-dwellers — have been set out for ornamental purposes. Few persons, beginning the study of botany, escape the perplexing experience of trying in vain to identify some exotic plant by a local manual under the impression that it must be a native. Finally, after prolonged and vexatious search, the plant is referred to some person of greater botanical experience, who with mortifying superiority pronounces it a foreigner and of course not to be looked for in the manual. Then inevitably comes the question we all have been asked: "But where can I get an inexpensive book that covers the foreign plants as well as the native ones? I mean a book with lots of illustrations, and with keys based on the leaves and color of the flowers and that sort of thing, not on those miserable placentas and arils and hypochils and all those little affairs that nobody can see — and, oh yes, the book must be in English, too." To this hitherto well nigh unanswerable question, at least a partial reply may now be given. "If you are studying the shrubs you will find that Professor Apgar's book fairly realizes your ideals."— B. L. R.

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THE VARIATIONS OF LONICERA CAERULEA IN EASTERN AMERICA.

M. L. Fernald and K. M. Wiegand.

As recently pointed out by Mr. Alfred Rehder in his *Synopsis of the Genus Lonicera*,[1] the American *Lonicera caerulea* differs from the plant of the Old World in several rather pronounced characters: "Winter buds upright and the branches generally spreading at an angle of less than 45°; corolla usually campanulate and glabrous, tube as long as or shorter than limb; . . . . accessory buds and stipular appendages wanting," while the Eurasian shrubs have "Winter buds more or less spreading and the branches diverging generally at an angle of more than 45°; tube of the generally funnel-form corolla usually longer than limb, mostly pilose without; stipular appendages and accessory buds often present." Of the Eurasian shrub several rather pronounced varieties (with numerous forms) are maintained, but all the American material is treated by Mr. Rehder as var. *villosa* (Michx.) T. & G., though with the qualification: "In regard to the pubescence the American plant seems nearly as variable as that of the Old World."

While collecting in western Newfoundland the writers were impressed by the very different appearance of two extremes of the species as found there, and upon further study of the question feel that the two should be distinguished as varieties. In one the leaves (above as well as beneath), new shoots, and sometimes the old bark are densely pilose or short-villous; in the other the leaves are sparingly pilose or glabrate, and the new shoots sparingly pilose or puberulent at tip but usually glabrous or glabrate below. As far as the herbarium

[1] 14th. Ann. Rep. Missouri Bot. Gard. 69, 73 (1903).

material shows, the more pubescent extreme is confined to the northeastern section of the continent,— from Labrador and Ungava to Lake Winnipeg, south to northern New England and Wisconsin,— and does not extend in its extreme development so far south as the smoother form. This very pubescent variety is without question the *Xylosteum villosum* of Michaux,[1] upon which Torrey & Gray based their *Lonicera cœrulea*, var. *villosa*.[2] In the original description Michaux characterizes the shrub as "X. ramis villosis: foliis. . . utrinque subtomentoso-villosissimis," and upon examination of the Michaux type by one of the writers[3] the following note was made: "Most *extremely* pubescent form from 'Lac des Cygnes [one of the sources of Mistassini River, Saguenay Co., Quebec], Mistassin et Riv. des Goelands.'"[4] This variety has received a second name, var. *canadensis* Delamare, Renault & Cardot,[5] ascribed by its authors to Lamarck, who seems not to have published such a combination, and based upon *Xylosteum Solonis* Eaton.[6] This *X. Solonis*, based by Eaton upon material "found on the White Mountains (N. H.) by Dr. D. Solon," was described as having "villose" leaves, and since true var. *villosa* is well known from the White Mountain region there is little question that *Xylosteum villosum* Michx. and *X. Solonis* Eaton are the same. So far as the writers have been able to discover, the widely distributed American shrub with glabrous or glabrate twigs has received no name and is here proposed as

Lonicera caerulea L., var. **calvescens** n. var., a var. *villosa* recedit foliis tenuiter pilosis vel glabratis, ramis novellis glabris vel tantum puberulis vel tenuiter pilosis demum glabratis.

[1] Michx. Fl. i. 106 (1803).

[2] T. & G. Fl. ii. 9 (1841).

[3] The Michaux Herbarium was studied by Mr. Fernald during the summer of 1903.

[4] Rivière des Goelands was Michaux's name for one of the branches of Rupert River, in southwestern Ungava. In Michaux's Journal for September 11, 1792, he says: "Il est très évident que le Pays situé entre le Lac des Cygnes et le Lac Mistassin est le plus élevé, car le Lac Mistassin se décharge dans la Baye d'Hudson par la riv. des Nids de Goelands qui coule au N. Ouest et le Lac des Cygnes se décharge dans le Fleuve Snt. Laurent par la riv. Mistassin, par le Lac Snt. Jean, par la riv. Chicoutoumé et enfin par la riv. Seganay jusqu'au Tadoussack ou elle rencontre le fl. St. Laurent. C'est avec difficulté que je nomme Rivièrre Mistassin la riv. que coule depuis le Lac des Cygnes jusqu' au Lac St. Jean. J'ay fait cette observation aux Canadiens qui vont traiter dans ce Pays avec Sauvages. Ils m'ont dit que l'on croyoit autrefois que l'on pouvoit remonter cette rivièrre jusqu'au lac Mistassin et que c'est pour cette raison qu'elle a été ainsi nommé par les Missionnaires Jesuites" — Journal of André Michaux, 1787–1796, ed. C. S. Sargent (Proc. Am. Phil. Soc. xxvi. no. 129) p. 85 (1888).

[5] Delamare, Renauld & Cardot, Fl. de l'ile Miquelon, 21 (1888).

[6] Eaton, Man. 26 (1817).

Resembling var. *villosa* but with the leaves only sparingly pilose or glabrate; the new twigs glabrous or merely puberulent or sparingly pilose, becoming glabrate.— Newfoundland to Ontario, south to Connecticut and Pennsylvania.[1] Type: swale, Goose Pond, Newfoundland, July 9, 1910 (*Fernald & Wiegand*, no. 4051, type-specimen in Gray Herb.). Among many other specimens examined the following are characteristic. NEWFOUNDLAND: moor, Whitbourne, August 16, 1894 (*Robinson & Schrenk*, no. 11). QUEBEC: Seven Islands, Saguenay Co., August 3, 1907 (*C. B. Robinson*, no. 688). NEW BRUNSWICK: Grand Manan, 1902 (*W. G. Farlow*). NOVA SCOTIA: dry fields, Truemanville, May, 1883 (*H. Trueman*). MAINE: shelves at 4000–4500 ft., west wall of North Basin, Mt. Katahdin, July 13, 1900 (*Fernald*). NEW HAMPSHIRE: Alpine Garden and Oakes' Gulf, White Mts., June 23 and 29, 1898 (*J. M. Greenman*, nos. 1076 and 1075); sphagnum bog, Jaffrey, August 29, 1898 (*B. L. Robinson*, no. 598). VERMONT: Willoughby, June 9, 1895 (*G. G. Kennedy*). MASSACHUSETTS: clearing in low woods, Walpole, May 19, 1897 (*W. P. Rich*), June 17, 1908 (*J. R. Churchill*). RHODE ISLAND: swampy meadow, North Smithfield, May 30, 1900 (*E. B. Chamberlain*, no. 129). CONNECTICUT: swamp, Killingly, July 2, 1903 (*C. H. Knowlton*); border of Great Cedar Swamp, Voluntown, June 17, 1899 (*C. B. Graves*). PENNSYLVANIA: Naomi Pines, Monroe Co., June 7–10, 1889 (*J. K. Small*). ONTARIO: Mer Bleue, near Ottawa, June 1, 1905 (*Macoun*, Herb. Geol. Surv. Can., no. 66, 467).

THE PASTURE-THISTLES, EAST AND WEST.

E. J. HILL.

IN the summer of 1909 I had an opportunity to examine for the first time in the field the eastern pasture thistle, *Cirsium pumilum* (Nutt.) Spreng., and to compare it with its nearest western relative, *C. Hillii* (Canby) Fernald, the only one of the two species which I have as yet seen in the vicinity of Chicago. The plants of *C. pumilum* were growing quite abundantly on a gravelly hillside pasture that sloped down to French Creek, just below the village of Saegertown, in northwestern Pennsylvania. The time of finding, Aug. 31st, being

[1] Var. *calvescens* may occur in northwestern America but the material at hand is inadequate for definite determination of that point, and, as already indicated by Gray (*Bot. Cal.*), Rehder, and others, seems to differ in some regards from the eastern varieties.

near the close of its floral season, only a few plants remained in flower, though an occasional bud was seen. The greater part, however, were in seed, or, having lost their fruit, were drying up or dying, having accomplished their work as biennial plants. But the most surprising fact was that some of them were still in flower, a few even in bud, indicating a season not yet completed, in marked contrast with the familiar form (*C. Hillii*) at home. For in the neighborhood of Chicago, whether growing in the prairie or in the open parts of the dune region, *C. Hillii* is virtually out of flower by the 25th of July. Most of the plants at this date have already lost their seed, and by the first of August the stems are generally withered and dry. I have found it in flower as early as the 20th of June, and its season may be considered as lasting about six weeks, from the middle of June to the first of August, the plants being at their best during the first ten days of July. As contrasted with that of *C. pumilum*, July–Sept., its season is June–July. It comes into bloom a little later than *C. Pitcheri* (Torr.) T. & G., the earliest thistle to flower here. As the latter is almost confined to dunes close by the shore of Lake Michigan in our region, where the coolness of the water of the lake commonly retards the shore-plants a week or more beyond the time when the same species blossom farther away from the shore, this also is to be taken into account for the earliness of *C. Pitcheri*. I have collected it in flower as early as June 12th. It may also be found with flowers the first part of August, new branches or shoots having started from a stem or root that carries withered or dried stems at the same time. Its season is therefore longer than that of *C. Hillii*, the duration about the same as that of *C. pumilum*, but with an earlier beginning and closing.

Another contrast between the two pasture-thistles, as I found them, is the more branching and somewhat taller habit of *C. pumilum*, and the resulting presence of a greater number of heads on the same individual. One commonly sees no more than three heads on a plant of *C. Hillii*. It often produces but a single large head crowning an unbranched stem 15 to 20 inches high. Occasionally five heads may be found on a more vigorous plant, or even more, particularly when the terminal bud of the main stem has been injured and branches are forced out from below. Nor is it so strongly armed as the eastern pasture-thistle, the prickles usually being weak.

But one of the chief distinctions lies in the roots of the two. This

fact too often escapes attention, it obviously being more convenient in collecting the plant to cut it off rather than to dig it up entire. The specimens of thistle at Saegertown had a tap root, more or less branching or with smaller side roots, the main root tapering downward as properly in a tap root. The roots of *C. Hillii* are fusiform, usually hollow, and connected by a narrow neck-like part with the base of the stem. Sometimes several spring from the base forming an imperfect fascicle, each connected with the stem by a slender neck. I have found as many as five of these to a single stem. An individual with three is figured in the proceedings of the Davenport Academy of Sciences, **8**: 287, Pl. 2, 1900. When single the root is generally perpendicular and runs deeply down, so that it is difficult if not impossible to pull it up, since the narrower neck almost invariably breaks off leaving the most characteristic portion in the ground. The plant being a perennial these several stems may be the product of different years, one of them being commonly longer and larger than the rest. As the bud for a succeeding year's growth forms a little beneath the surface, it would be advantageous to send down a new subterranean part to aid in perpetuating the plant.

Though the flowers of *C. Hillii* are normally of a deep shade of pink-purple, they sometimes take on a brighter shade of red or become red-purple, or magenta-like. In such cases a large head two or three inches across becomes very ornamental in character. The bracts of the involucre in this western thistle are very glutinous on account of a dark gland near the tip. But I found on the bracts of the pasture thistle (*C. pumilum*) at Saegertown a more glutinous line than might be inferred from the common descriptions, the bracts being sticky enough to adhere with considerable force to the drying papers and tear off bits of the latter when removed.

The habitat of *C. Hillii* is a dryish soil. It comes under Warming's classification of mesophytic plants, an inhabitant of prairies, meadows and pastures, but with a tendency towards the drier extreme. My first collection of the plant, near the Kankakee river at Waldron, Ill., June, 1870, is labelled as from "dry fields." It was then confounded with *C. pumilum*, as our only pasture thistle. So too at first in the sand region east of Chicago where its distinctness was subsequently observed. It was on the low sand ridges that run somewhat parallel with one another on the old lake bottom, raised but a few feet above adjoining sloughs or ponds, only slightly above the present level of

Lake Michigan. These low sand ridges of beach and shore deposits bear a scattered growth of pines and oaks, and are sufficiently open and sunny to admit a number of the plants common to the drier prairies beyond the limits of the old lake basin. It is these low ridges that characterize the western part of the sand region. In the dune region proper, where the surface is broken by high sand hills enclosing ponds or shallow depressions of moister ground, I have never met with an example of this thistle. This dune area lies mainly east of the new city of Gary, and as the region west of this place is largely used for factories of various kinds and cut up by a net-work of railroads and switches, the thistle here is likely soon to become extinct. But it fares better south and west of Chicago in the prairie region, where it still occurs in the more rolling parts of pastures and meadows, or in lower sand areas of the drift formation, particularly in railway enclosures fenced off from the surrounding prairie before the land had been touched by the plow. Here it is one of the few native denizens of the prairie that seem able to compete with an introduced vegetation. It may return again to ground from which it had been excluded by cultivation, when this is seeded down for a time for pasture or meadow, and left a few years untilled. It is greatly helped in this by its copious plumose pappus for the wind dispersion of its seeds. It has the additional advantage of early fruiting, some of its seeds maturing in a meadow before the grass may be cut. It thus takes on the character of a pasture or meadow thistle, and grows successfully beside the white and the red clover, timothy, and the most common meadow and pasture grasses of drier grounds, *Poa pratensis* and *P. compressa*.

Chicago, Illinois.

NOTE ON DESMODIUM CANESCENS AND HYOSCYAMUS NIGER.

Walter Deane.

I have read with much interest Prof. M. L. Fernald's Notes from the Phaenogamic Herbarium of the New England Botanical Club,—I, in Rhodora for September, 1910, and succeeding Notes will be most welcome. They give definiteness to the records and they will stimu-

late a search in the field and herbarium for new stations for plants cited.

Desmodium canescens (L.) DC. grows freely on the southeastern slope of Prospect Hill, Waltham, Massachusetts. Mr. Henry A. Purdie, an enthusiastic observer of our local flora, showed me the location on August 13, 1910. The plant grows in dense patches some 4 meters in diameter and 1.1 meters in height in dry, more or less rocky soil. The large ovate leaflets are very handsome, and on examination show the large persistent, ovate, pointed stipules. The flowering period was nearly past and the young fruit was beginning to appear. The robust and vigorous rootstocks ensure the continuance of the species if the perhaps necessarily heroic treatment of the Park Commissioners does not destroy it. The low growth had been cut off on the hill-side some time before, as was shown by the mutilated tips of many of the plants which had, nevertheless, sent up a fresh supply of stems.

This species, rare in eastern Massachusetts, was growing in company with several of its near relatives, which covered the ground under the light foliage of the trees and in more open spaces. Indeed, I never saw such a display of Desmodium, and the blending of so many species on the beautiful hill-slope amid the glancing shadows was an exquisite sight. *Desmodium rotundifolium* (Michx.) DC. grew in dense patches from 12 to 20 decimeters across, close to the ground. *D. Dillenii* Darl. was very abundant in flower, while *D. paniculatum* (L.) DC. was in large continuous areas, making a fine display with its glossy foliage and brilliant flowers. *D. rigidum* (Ell.) DC. was represented by a single clump near the entrance to the park, and *D. marilandicum* (L.) DC. was extremely abundant and nearly past flower. Other species would doubtless have rewarded a longer search. Specimens of *D. canescens* are in my herbarium.

An examination of my collection shows a specimen of *Hyoscyamus niger* L. that I collected on my father's place on Sparks St., Cambridge, Massachusetts, in 1888. It was growing spontaneously in the garden as a weed, and, on September 2, I took from it a specimen in flower and young fruit, besides pressing and pocketing dissected flowers. Later, on November 14, I took the remainder of the plant in full fruit with ripe seeds. The tap root is forked, and is 4.1 decimeters in length. I did not quite reach the tip.

Cambridge, Massachusetts.

SOME ADDITIONS TO THE RHODE ISLAND FLORA.

M. L. Fernald.

No well settled area of New England, except perhaps New Hampshire (outside the White Mountain and Monadnock areas), has a more meagre representation in the larger herbaria than Rhode Island. Members of the New England Botanical Club, who have spent much time in preparing the Check Lists of various groups, have experienced great difficulty in finding satisfactory evidence of the occurrence in these states of many of the widely distributed species. It is therefore desirable that whenever opportunity offers collections from these states be made and placed in the Club Herbarium or in other public or semi-public collections. On June 19 last the writer, while spending the day at Buttonwoods Beach in Warwick, Rhode Island, was impressed with the number of plants which might prove of interest to students of plant-distribution; but as he was not equipped to preserve specimens at that time delayed the gathering of most species until the following Saturday, June 25, when with Mrs. Fernald he made a half day's collecting trip from Warwick Station (electric) to Buttonwoods. The region is in the sandy flat coastal belt and the vegetation is very typical of such areas, so that no detailed account of the flora is called for; but in labeling the specimens collected the writer finds that thirteen of them are of species or varieties which have not been previously recorded from Rhode Island, or at most have been included without statement of locality in general manuals or similar works. These plants are here noted not because of their rarity but that records of their occurrence in the state may be accessible to future workers.

Panicum dichotomum L. Oak woods, Buttonwoods.

Panicum Lindheimeri Nash. Sterile meadow near the border of a salt marsh, Warwick.

Juncus dichotomus Ell., var. platyphyllus Wiegand. Sandy thicket, Warwick.

Sisyrinchium gramineum Curtis. Abundant in meadows at the edge of a salt marsh, Warwick, the flowers much deeper blue-purple than in the following.

Sisyrinchium atlanticum Bicknell. With the preceding. Repre-

sented in the herbarium of the New England Botanical Club by specimens from Cranston (*Collins*) and from a salt meadow, Middletown (*B. L. Robinson*).

CERASTIUM SEMIDECANDRUM L. Abundant in sandy fields near Buttonwoods Beach. Previously recorded in New England only from East Lyme, Connecticut (*Graves*, RHODORA, iii. 65), but represented in the Gray Herbarium by characteristic material collected by Judge J. R. Churchill at "Asyllum," Nantucket, May 28, 1904.

× FRAGARIA GRANDIFLORA Ehrh. The commonly cultivated Strawberry is abundantly established on the railroad embankment near Buttonwoods station. It was found by J. F. Collins and the writer in a similar habitat at Elmwood, May 18, 1898.

× LYSIMACHIA PRODUCTA (Gray) Fernald. Abundant in a boggy meadow, Warwick. The only member of the genus noticed.

APOCYNUM CANNABINUM L., var. PUBESCENS (R. Br.) DC. Sandy thicket back of Buttonwoods Beach. Represented in the Gray Herbarium by a specimen collected by Olney at Smithfield, July 23, 1845.

SCROPHULARIA LEPORELLA Bicknell. Gravelly banks near Buttonwoods station.

GALIUM CLAYTONI Michx. Boggy meadow, Warwick.

CARDUUS ACANTHOIDES L. Abundant in gravel along the electric railway from Warwick station to Buttonwoods, and presumably beyond in each direction. Collected by J. F. Collins in 1895 on "cove lands," Providence.

HYPOCHAERIS RADICATA L. Sandy grassland, Warwick, a few plants only. Already established near New Bedford and at other scattered points on the Atlantic coast and likely to become a troublesome weed.

GRAY HERBARIUM.

PINUS RESINOSA IN NORWOOD, MASSACHUSETTS.— Two or three years ago while riding on the Midland Division of the N. Y. N. H. & H. Railroad, I noticed from the car window a pine tree which seemed to be *Pinus resinosa* Ait. It stands apart from the other pines in a pasture between Ellis Station and Norwood, on the eastern side of the track. Although I saw the tree several times from the train, I was unable to identify it absolutely until this year, May 14, 1910.

On that date I went to the tree and secured specimens. The local flora committee received reports of this species from several scattered stations as far south as Chestnut Hill, Brookline, so this new station extends the range several miles southward.— CLARENCE H. KNOWLTON, Hingham, Massachusetts.

NOTE ON JUNIPERUS HORIZONTALIS AND J. VIRGINIANA.— While engaged recently in the preparation of a key to the New England junipers, I noticed that besides the differences between *Juniperus horizontalis* Moench and *J. virginiana* L. emphasized in Gray's Manual, other characters of some value in the separation of these species are afforded by the fruit. In the Gray Herbarium material, which I examined with Prof. Fernald, it was found that the fruits of *J. horizontalis* contained generally four seeds, rarely three or five, when mature chestnut-brown and roughened. *J. virginiana*, on the other hand, had fruits with one or (usually) two seeds, very rarely three, rather pale ashy-brown and smooth at maturity. The representation of mature-fruited *J. virginiana* at hand being rather scanty, I dissected 66 of the berries, collected in Stoughton, finding 52 with but one well-developed seed each, and only 14 with two, reversing the proportions we had been led to expect from the study of the Herbarium material. This latter, however, coming as it does from widely separated localities, probably more truly represents the normal numerical tendencies of the *J. virginiana* fruits.— SIDNEY F. BLAKE, Stoughton, Massachusetts.

THE NORTH AMERICAN SPECIES OF PANICUM.— Possibly no monograph of similar scope in American taxonomic literature represents a more intensive and critical study than Hitchcock and Chase's treatment of Panicum,[1] which has just appeared from the Government Printing Office. By extensive field-work, continued through several seasons, both authors have obtained first-hand knowledge of nearly every species which reaches the United States, and of many Mexican and West Indian species. Their field-work has been supplemented by green-house cultures, in order to establish beyond doubt the identity of the vernal and autumnal phases of many species, and by a thorough study of most of the Panicum material in European

[1] The North American Species of Panicum, by A. S. Hitchcock and Agnes Chase. Contributions from the United States National Herbarium, XV, Washington, 22 Oct. 1910.

and American herbaria. In the extent to which Hitchcock and Chase have borrowed and determined the collections belonging to smaller institutions and to individuals, they have set an example which other monographers may well follow. Few professional botanists have any idea of the stimulus which can thus be given to botanical collecting and exploration.

The monograph covers all America north of Panama, including the West Indies. In this area the authors recognize 205 species and subspecies, although they exclude from Panicum a number of outlying groups, which are better treated as generically distinct. It gives one faith in the serviceability of the authors' species-concept to know that they have been able to place, definitely, with no evasion and no side-tracking, a mass of material numbering many thousands of sheets. Yet the work contains only 16 new species and subspecies. To most botanists the treatment might have been made a trifle more satisfactory if certain varieties and forms, which are informally defined, with citation of specimens, had been named instead of treated as "exceptional specimens."

A feature which deserves the highest praise is the full discussion, under each species, of the synonyms which are referred to it. Prof. Hitchcock has studied practically every extant specimen of American Panicum, which has ever been designated as a type, or can be construed as a type. The result is a surprisingly short list of "Doubtful Species" and a critical commentary on the synonymy which will be of great use to future students. In this connection it may be noted that misapplied names (*i. e.*, published errors in determination) are given no nomenclatorial standing.

The description of each species is accompanied by two text-figures, an enlarged spikelet and a map showing, roughly, the geographic range in the United States. In nearly every case the spikelets have been drawn from type or authentic material, and are thus of permanent value as standards for comparison, regardless of what difference of opinion may ever arise in regard to the delimitation of groups or the identity of particular specimens. It is unfortunate that the presswork at the Government Printing Office was not of a high enough order to make the most of Mrs. Chase's beautiful figures. The maps are not as useful as they would have been if the dots had always been placed so as to indicate precise localities. A dot placed in the center of a state is used frequently to indicate a general distribution of the species in that state.

In the citation of specimens the authors have been unusually liberal. They have not only cited specimens under each species, to show the geographic range, but they have also prepared an index to numbered specimens which will prove one of the best features of the book.

The treatment of the dichotomous Panica (under the newly named subgenus Dichanthelium Hitchcock & Chase) is painstaking in the ex-

treme. There is a key to the 17 sections of the subgenus with page references to sectional keys, which are introduced at the appropriate places in the text. In addition, there is an artificial key to the whole subgenus, in which the species are not retained in taxonomic sequence.

The authors have followed the "American" code of nomenclature. In a few cases specific names are used which would not be authorized by the Vienna Code. An interesting example is that of *Panicum polyanthes*, a name justified by the "American" rules but not by the Vienna rules (although it has crept into Gray's Manual, ed. 7!) The valid name is *Panicum multiflorum* Ell. 1816. *Panicum multiflorum* Poir. 1816 is *P. dichotomiflorum* Mx.

Hitchcock and Chase have given us a book of enduring worth,—a book which it is a pleasure to own and which it will be a greater pleasure to use.— H. H. Bartlett, Bureau of Plant Industry, Washington, D. C.

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THE USE OF CORRUGATED PAPER BOARDS IN DRYING PLANTS.

J. Franklin Collins.

At a recent meeting of the New England Botanical Club the writer spoke briefly of a method of drying plants that he had used during the preceding season under certain particularly adverse conditions. Considerable interest in the possibilities of the method was shown by the members present, and numerous questions of a practical nature were asked as to details and results. Partly because this method appears not to be generally known, and partly because it has certain commendable time- and labor-saving features that will appeal to all active collectors, as well as to those who have but little time for the work, the following account of it is here given.

During the discussion of the matter at the meeting the fact (previously unknown to the writer) developed that at least three other members of the Club had, within two years, been using a somewhat similar method (at least as to certain details) in their own field work. Since this meeting the writer has undertaken a few experiments to determine the practical value of certain theoretically interesting details that were brought out by the discussion mentioned. It is not the purpose to enter into details of these experiments, nor into unimportant features of the drying process, but merely to explain briefly its essential points. Any collector can easily modify or elaborate these to suit certain special conditions, or to please his own whims.

The special advantages of the new method, when compared with the old, that will appeal to all whose time is very limited, are (1) that

there is no necessity of changing driers, (2) that driers need not be spread out to dry, (3) that colors of flowers and foliage are more perfectly preserved, (4) that plants which formerly took a week to dry can almost invariably be perfectly dried in less than 24 hours, and commonly in less than 12 hours.

The contrasting disadvantages are so few and unimportant that they are hardly worth mentioning. It is argued that the rapid drying contributes to brittleness, that the corrugated boards make ridges on the plants, and that bulky specimens are not easily handled. Neither of the first two have been apparent to any very noticeable extent (certainly to no serious extent) in the writer's experience, and the last is one that exists under almost any generally known method of drying plants.

To one already outfitted with the presses, driers, etc., needed for drying plants by the usual method the added expense in adopting the new one need not necessarily exceed a dollar, for a press a foot in thickness.

Under the particularly adverse conditions mentioned in the opening sentence of this article no driers were obtainable, and only a few second-hand sheets of single-faced corrugated card board. These latter were cut into sheets of the proper size, care being taken to have all the grooves run in one direction (across the press). The plants were placed, in the usual manner, in specimen sheets cut from old newspapers; one of these was laid on a corrugated board and another similar board placed on top of it. In this manner the press was built up. Wooden boards of a convenient size were used for the sides. Heavy cords tightly drawn about the press furnished the only available means of applying the pressure, but it answered all practical purposes. In building up the press care was taken to have the smooth side of each corrugated board down (or vice versa), for if odd ones were reversed the corrugations of the two adjoining sheets would interlock and cause deep grooves in the specimen between them. This press was suspended by a wire in such a way as to have the grooves of the paper boards vertical, and the press about four or five feet from the floor. A piece of unbleached cotton sheeting was sewed up in such manner as to suggest, in size and appearance, a dress skirt. By means of a draw-string at the top of this cloth it was fastened tightly about the middle of the suspended press, the bottom (about a foot from the floor) being held open by means of a

stiff wire hoop sewed in at the lower edge. Under this an ordinary lamp with a single ⅝ inch wick was set on the floor and kept burning. This lamp heated the air confined under the press and inside the cloth, and drove it up through the grooves of the corrugated boards. The lamp consumed less than one cent's worth of oil in ten hours.

This is a brief description of the simple "make-shift" press that first demonstrated the advantages mentioned above. Since returning home the writer has tried certain modifications which show that somewhat better specimens can be obtained, though not so quickly dried, if the press is built up as follows; a corrugated board, a regulation drier, a specimen sheet with the inclosed plant, a drier, a corrugated board, and so on. Although the double-faced corrugated board (smooth on both surfaces) is better to handle, and can be used either side up, it appears doubtful at present if it has any particular advantages otherwise over the single-faced.

Professors M. L. Fernald and K. M. Wiegand have been using corrugated boards with excellent results for the past two seasons to ventilate their field presses. These boards were at first placed an inch or more apart in the press which was otherwise handled in much the manner that is familiar to most of us; but during the past season they were employed as described in the last paragraph, except that one change of driers was made in order to straighten folded leaves, etc. As a result Messrs. Fernald and Wiegand found it possible, in an unusually damp atmosphere, to leave their presses unattended after the first change of driers and to make prolonged collecting trips without fear that the plants left in press would be injured. Mr. J. H. Emerton has recently been using a press, with good results, in which corrugated boards and cotton wadding are the most conspicuous features. During the past summer Dr. H. S. Conard used a press very similar to the one described above in connection with his work at Cold Spring Harbor, N. Y. He spoke very enthusiastically of its merits, and some of his suggestions have been adopted here.

In all of these presses the one most important feature is the cheap and efficient ventilation furnished by the corrugated boards, thus allowing the easy and rapid dissipation of moisture, and at the same time precluding all danger of mildew or blackening under ordinary conditions. This statement also applies to presses used in foggy or humid regions. The nearer together in the press these ventilators are placed the more rapid will be the drying process, even if artificial

heat is not used. By applying artificial heat in some such manner as indicated above the drying process is greatly hastened. If one is unable to arrange the plants satisfactorily when they are first put into the press the latter can easily be left for half a day or more, and then opened and the plants rearranged finally, before artificial heat is applied.

Of the various forms or modifications of the corrugated paper board press that the writer has tried none has dried the plants so rapidly as the "emergency" press, without driers, described above. In actual use this press was almost always emptied each day and ready for the new lot of plants before they were ready for the press. It had the disadvantage, mentioned above, however, of not satisfactorily taking care of thick and bulky specimens, especially fern rootstocks, etc., unless a packing of paper, cotton wadding, or something of that sort, was used about the thick parts. This disadvantage is greatly reduced when the regular driers are used along with the corrugated sheets.

This type of press has already clearly demonstrated its great value as a time-saver not only for spermatophytes, but to an even greater extent for mosses, lichens, certain fungi, and, to a somewhat less extent, for algae and fleshy fungi. Soaking-wet sphagna have been completely dried in less than five hours, though these usually require six or more hours in the ventilated press.

More permanent and convenient, though less portable, modifications of the apparatus described above can easily be planned for home use, as has been done at the writer's home and at Brown University. At the former place a small oil stove and a wooden case are used in place of the lamp and cloth; at the latter a small electric heater, costing about $4.00, which can be plugged into any incandescent lamp socket, is used to supply the heat. Other sources of heat may sometimes be utilized to advantage, for instance, a cook stove, a furnace register, a steam or hot water radiator, steam pipes, etc.

Brown University, Providence, Rhode Island.

THE REPRESENTATIVES OF ERIGERON ACRIS IN NORTHEASTERN AMERICA.

M. L. Fernald and K. M. Wiegand.

Erigeron acris L. is the type of a small group of plants which has one or more representatives in nearly all the boreal districts of the northern hemisphere. Until recently members of the group were unknown in New England and adjacent Canada, but we now know one of them as a frequent plant of clearings and open banks as far south as the Rangeley Lakes in western Maine, so near the New Hampshire border that the plant may be sought with confidence in northernmost New Hampshire; another representative of the series has long been known from Labrador but its identity not clearly made out, and this plant has recently been found in Quebec south of the St. Lawrence; and a third plant, of Anticosti, though represented in herbaria, has remained without definite identification until the present time. In studying these plants and their affinities the writers have found it convenient to draw up the following brief synopsis to cover the leading characters.

* Cauline leaves lanceolate, with smooth or slightly ciliate margins, usually much exceeded by the peduncles or the branches of the inflorescence.

E. acris L. Plant more or less hirsute: inflorescence racemose or paniculate, of numerous medium-sized heads (involucres 5–9 mm. high): involucral bracts very hirsute.—Sp. Pl. 863 (1753); Gray, Syn. Fl. i. pt. 2, 219 (1884), in great part.— Said by Dr. Gray to occur in Labrador, but seen by us only from Eurasia and the Rocky Mountain region. Represented in the East by

Var. asteroides (Andrz.) DC. Similar in habit, glabrous or only slightly hirsute: peduncles and involucre glandular-puberulent; involucral bracts at most a little hirsute at base.— Prodr. v. 290 (1836). Var. *droebachensis* Blytt, Norges Fl. i. 562 (1861); Gray, Syn. Fl. i. pt. 2, 220 (1884). *E. droebachensis* O. F. Muell. Fl. Dan. v. pl. 874 (1782). *E. asteroides* Andrz. ex Besser, Enum. Pl. Vohl. 33 (1821–22).— Recent clearings, open banks, etc., Gaspé County, Quebec, to Alaska, south to southern New Brunswick, northern Maine, northern Michigan, Colorado, Utah, and Oregon; also Eurasia. In the Northeast known as far south as the Kennebeckasis River, New Brunswick (Norton, coll. *Hay*), the Mattawamkeag River, Maine (Crystal, coll. *Fernald*), and the Rangeley Lakes, Maine (Kennebago Lake Trail, coll. *Miss Furbish*).

Var. **oligocephalus**, n. var., caulibus solitariis vel caespitosis 6–30 cm. altis hirsutis eglandulosis vel non evidenter glandulosis; capitulis subnutantibus demum erectis solitariis vel 2–8 laxe corymbosis, pedunculis plerumque elongatis valde ascendentibus; involucro 7–10 mm. longo, bracteis lineari-attenuatis appressis hirsutis; radiis lilacinis in siccitatis subcaeruleis discum paullo superantibus.

Stems solitary or tufted, 6–30 cm. high, hirsute, glandless or not obviously glandular: heads at first somewhat nodding, becoming erect, solitary or 2–8 in a loose corymb, the mostly elongate peduncles strongly ascending: involucre 7–10 mm. long; its appressed linear-attenuate bracts hirsute: rays lilac (drying bluish), slightly exceeding the disk.— Var. *debilis* Gray, Syn. Fl. i. pt. 2, 220 (1884) as to Labrador and Hudson Bay plants. *E. alpinus* β Hook. Fl. Bor.-Am. ii. 18 (1834). *E. elatus* Greene, Pittonia, iii. 164 (1897), not *E. alpinus* γ *elata* Hook. l. c.— Labrador to Mackenzie, south to Gaspé County, Quebec, and Alberta. Examined from the following stations. Labrador: near Okak (*Weiz*); wet calcareous-sandstone crests and slopes, Blanc Sablon, August 6, 1910 (*Fernald & Wiegand*, no. 4138, type in Gray Herb.). Hudson Bay (*Burke*). Quebec: gravelly banks of River Ste. Anne des Monts, July 16, 1906 (*Fernald & Collins*, no. 255). Mackenzie, Fort Good Hope, July 12, 1892 (*Elizabeth Taylor*, no. 29). Alberta, above Laggan, July 13, 1904 (*John Macoun*, Herb. Geol. Surv. Can., no. 65,548).

The Weiz material from northeastern Labrador and the Burke specimens from Husdon Bay were included by Dr. Gray in var. *debilis*, but the more recent collections from southern Labrador and eastern Quebec show that the eastern material differs in several points from the northwestern specimens which were first cited and well characterized in the original description of var. *debilis*. In true var. *debilis* the heads are commonly smaller, the peduncles and involucres are obviously glandular-puberulent but scarcely hirsute, the involucral bracts have somewhat squarrose tips, and the rays in dried specimens are roseate and conspicuously longer than the disks. As shown by an authentic specimen given by Hooker to Gray our plant is Hooker's *E. alpinus* "β. foliis angustioribus, ramis elongatis" from the "Rocky Mountains in elevated situations." [1] Var. *oligocephalus* also matches very closely the description of *E. elatus* Greene, but it apparently is not *E. alpinus* γ *elata* Hook., from which variety Greene derives his specific name. Hooker's *E. alpinus* γ *elata* was very inadequately described, being distinguished from *E. alpinus* by the single word "subpedalis," but, whether or not its name can be con-

[1] Hook. Fl. Bor.-Am. ii. 18 (1834).

sidered much better than a *nomen nudum*, a specimen of it given by Hooker to Gray shows it to be a much more leafy plant than *E. acris*, var. *oligocephalus*, with the comparatively short-peduncled heads forming a racemose inflorescence as in true *E. acris* and the var. *asteroides*.

* * Cauline leaves elongate-linear, bristly-ciliate, usually equaling or exceeding all but the uppermost peduncles of the strict raceme.

E. LONCHOPHYLLUS Hook. Fl. Bor.-Am. ii. 18 (1834). *E. armerifolius* Turcz. in DC. Prodr. v. 291 (1836). *E. armeriaefolius* Gray, Proc. Am. Acad. viii. 648 (1873), Syn. Fl. i. pt. 2, 220 (1884). *E. racemosus* Nutt. Trans. Am. Phil. Soc. vii. 312 (1841).—A characteristic plant in saline meadows from the Black Hills and the Saskatchewan Plains westward across the Rocky Mountain region: also in northern Asia. The only eastern material seen by us is from Anticosti (coll. *Verrill*). This specimen was on a sheet in the Gray Herbarium with other material and seems to have formed the basis for Dr. Gray's record in the Synoptical Flora of *E. acris* (true) from Anticosti.[1]

WILLIAM GLEASON GOLDSMITH.

October 7, 1910,[2] passed away at his home in Andover, Mass., William Gleason Goldsmith, a very versatile and gifted man. Born in Andover, November 28, 1832, the eldest son of Jeremiah Goldsmith and Elizabeth Gleason — he was trained for college at Phillips Academy. After the usual four years course at Harvard, he graduated with high honors in 1857, ranking especially high as a Greek scholar. While there he studied botany with Prof. Gray and also studied anatomy. During the year 1858, he read law with Squire Hazen, until he was called to accept the position of Principal of Punchard Free School, which he held from 1858–1886. During a brief inter-

[1] The occurrence of *E. lonchophyllus*, a typical plant of saline habitats in the Rocky Mountain region, at an isolated station near the mouth of the St. Lawrence calls to mind the similar occurrence of *Aster angustus* T. & G., which grows in "wet saline soil" (*Nelson*) in the Rocky Mountain area, at a single station on the lower St. Lawrence (Cacouna, where it grows at the margin of the salt marsh); and a station of the similar *Aster frondosus* T. & G. on salt marshes at Brackley Point, Prince Edward Island, though otherwise known only on saline spots from Wyoming and Colorado to the Sierra Nevada.

[2] For the dates in this notice I am indebted to the issue of the Andover Townsman for Friday, October 14, 1910.

ruption in these duties, resulting from a fire which destroyed the school, he was Peabody Instructor of Natural Sciences at Phillips Academy. After Dr. Taylor's death he finished a period as Principal of the Academy. Under Cleveland's administration he accepted the position of postmaster of Andover, which he filled with preeminent ability from 1886–1895. From 1898–1901 he was Chairman of the Board of Selectmen, a calling to which he devoted his usual zeal and talent. He made two trips to Europe for study and travel, and one to Colorado, where he was much interested in the flora.

But I wished, especially, to say a word concerning Mr. Goldsmith as a student of nature and a teacher. He was one of those humbler men of science, who, though not widely heralded, because they are not known by collections or writings, are none the less worthy to be remembered. He was one of the old type of local naturalist, which is becoming only too scarce. A keen observer — an enthusiastic student — widely read — he was well equipped as a teacher. Endowed with a charming manner and a quiet but irresistible enthusiasm, he could not but inspire those who were fortunate enough to be his pupils with a love for their study and their master. His loyal and admiring students hope to live to do honor to his name and to the thoroughness of his early training. I want also to take this opportunity of acknowledging my debt of gratitude to him. Although long interested in botany, it was primarily to Mr. Goldsmith that I owe my choice of it as a profession.— Albert Hanford Moore, Washington, D. C.

THE AFFINITIES OF A CERTAIN BOREAL VARIETY OF GALIUM.

K. M. Wiegand.

In connection with a study of *Galium trifidum* and its allies the writer published in 1897 [1] the variety *Galium trifidum*, var. *subbiflorum* based upon material collected in Colorado by Hall and Harbour (no. 230). The range was given as "Arizona and California to Oregon and the Saskatchewan," and material was then at hand from Arizona,

[1] Wiegand, K. M.— Galium trifidum and its North American Allies, Bull. Torr. Bot. Club, vol. 24, pp. 389–403. (1897).

Utah, California, Oregon, Colorado, Wyoming, and Saskatchewan. The variety was described as being somewhat stouter and with less scabrous stems than the typical form; with larger leaves; pedicels variable in stoutness, rarely two- or even three-flowered, and nearly glabrous; and the following note was added: "This variety approaches *G. Claytoni* and *G. Brandeegei*." On another page (p. 391) of the same paper the following statement was made; "It has affinities on the one hand with *G. Claytoni*, and on the other in its smaller forms with *G. Brandegeei*."

During the past summer the writer, in company with Prof. M. L. Fernald, obtained some interesting material of *Galium* in Labrador and Newfoundland which has led to a rather extended study of the material in the Gray Herbarium and the Herbarium of the New England Botanical Club of *Galium trifidum*, *G. trifidum*, var. *subbiflorum*, and *G. Claytoni* as well as other closely related species and varieties. As a result we both now believe that the var. *subbiflorum* is much more closely related to *G. Claytoni* than to *G. trifidum*, and that, although the variety is intermediate in appearance between these two species, an error in judgment was made in connecting it with *G. trifidum*. In addition, many sheets were found in the Gray Herbarium from various portions of northeastern America which were labeled *G. Claytoni* but which it was impossible to distinguish from the *G. trifidum*, var. *subbiflorum* of the Rocky Mountains. On the other hand, all gradations were found in the Northeast between this form and the true *G. Claytoni*. As a result we are both now convinced that unquestionably the var. *subbiflorum* is more closely related to *G. Claytoni* and should be transferred to that species and that the range should be extended to include the northeastern specimens mentioned, as follows: —

Galium Claytoni Michx., var. **subbiflorum**, n. comb.— *G. trifidum* L., var. *subbiflorum* Wiegand, Bull. Torr. Bot. Club, vol. 24, p. 399 (1897).

This variety differs from the typical form principally in the arrangement of the flowers, some of which are borne singly on straight or arcuate, axillary, less stout, often very slightly prickly peduncles of varying length, while other similar peduncles bear two or even three flowers on short ascending pedicels. In the typical *G. Claytoni* the majority of the flowers are borne on stout, straight, glabrous, widely spreading or reflexed occasionally once-forked pedicels in three-rayed bracteate umbels.

As at present understood the range of the var. *subbiflorum* is from

Labrador and Newfoundland to Maine; Michigan; the Rocky Mountains; and the Pacific Coast states.

Some typical eastern specimens are: — Labrador: Blanc Sablon, July 30, 1910, *Fernald & Wiegand*, no. 4040. Newfoundland: Birchy Cove, July 22, 1910, *Fernald & Wiegand*, no. 4039. Quebec: Vicinity of Cap à l'Aigle, July 22, 1905, *J. Macoun*, no. 68144; in sphagnum, Table-top Mountain, Gaspé County, Aug. 5, 1906, *Fernald & Collins*, nos. 722, 723; alluvium of Nouvelle River, Nouvelle, Bonaventure Co., July 19 and 20, 1904, *Fernald & Collins*. New Brunswick: Brackish marsh, Bathurst, July 24, 1902, *Williams & Fernald*. Nova Scotia: pebbly lake shore, North Sydney, Cape Breton Island, July 21–25, 1901, *Howe & Lang*, no. 752. Maine: Mt. Desert Island, July 12, 1897, *E. F. Williams* Michigan: Isle Royale, July and August, 1909, *W. S. Cooper*, nos. 18, 19, 20; Turin, Marquette Co., June 21, 1901, *B. Barlow*.

One result of this study is to emphasize more than ever the distinctness of *G. trifidum* from all of its near relatives. The variety here under discussion has long been a source of confusion, but the discovery of many transitions to *G. Claytoni* rather than to *G. trifidum* makes its position quite clear.

Wellesley College.

ERRATA.

Page 28, line 12; *for* ton *read* tun.
" 38, " 1; omit the comma after those.
" 66, " 2, 3; *omit* by the Vienna Rules.
" 66, " 4; *for* for us *read* by the Vienna Rules.
" 67, " 38; *after* Collect *insert* a period.
" 85, " 42; for COMGLOMERATUS read CONGLOMERATUS.
" 86, " 33; *for* Buchenan *read* Buchenau.
" 96, " 31; *for* Leharpe *read* Laharpe.
" 98, " 3; *for* T. *read* J.
" 103, " 30; for *Euphasia* read *Euphrasia*.
" 140, " 21; for SERYPLLIFOLIA read SERPYLLIFOLIA.
" 160, " 17; *for* of *read* for.
" 170, " 15; *for* Grey *read* Gray.
" 186, " 9; for *lanceolatus*, read *lanceolata*.

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